EX. 9

OG&E Energy Corp. P.O. Box 321
Oklahoma City, Oklahoma 73101-0321
405-553-3000
www.oge.com

August 10, 2006

OG/E

CERTIFIED MAIL 7004 0750 0000 9145 8424

Ms. Rhonda Jefferies
Dept. of Environmental Quality
Regional Office at Tulsa
3105 E. Skelly Drive, Suite 215
Tulsa, Oklahoma 74105

Subject: **Stack Sampling Reports**
Muskogee Generating Station, Unit 6

Dear Ms. Jeffries:

In response to Request for Information 05-AQR-016, OG&E provides the enclosed Stack Sampling Report for Muskogee Generating Unit 6, conducted June 13-14, 2006. If you have any questions concerning the reports please contact me at (405)553-3690.

Sincerely,

David Branecky
Manager, Air Quality

Enclosure

IXOS ID 3554

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
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1. Article Addressed to:

RHONDA JEFFRIES
ENVIROMENTAL PROGRAMS MGR
ODEQ
REGIONAL OFFICE AT TULSA
3105 EAST SKELLY DRIVE, SUITE 200
TULSA, OK 74105

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☒ Addressee

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C. Date of Delivery 8-28-06

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PS Form 3811, August 2001 Domestic Return Receipt 102595-02-M-1540

AIR SAMPLING ASSOCIATES, INC.

P.O. Box 1175 • Lewisville, TX 75067 • Phone: (972) 492-1403 • Toll-Free: (866) 311-9940 • Fax: (972) 492-1402
407-2B Holford's Prairie Rd.• Lewisville, TX 75056

STACK SAMPLING REPORT
FOR
COMPLIANCE TESTING
ON THE
OG+E ELECTRIC SERVICES
MUSKOGEE POWER PLANT
UNIT NO. 6 STACK

MUSKOGEE, OKLAHOMA

PROJECT NO. 06-032

JUNE 2006

PREPARED FOR:
OG+E ELECTRIC SERVICES
321 NORTH HARVEY
OKLAHOMA CITY, OKLAHOMA 73101

PREPARED BY:
AIR SAMPLING ASSOCIATES, INC.
P.O. BOX 1175
LEWISVILLE, TEXAS 75067

(Total Number of Pages Including Cover: 85 pages)

AIR SAMPLING ASSOCIATES, INC.

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AIR SAMPLING ASSOCIATES, INC.

EXECUTIVE SUMMARY

Air Sampling Associates, Inc. of Lewisville, Texas conducted compliance testing on the OG+E Electric Services, Muskogee Power Plant, located near Muskogee, Oklahoma. The testing was performed to determine the amount of particulate matter being emitted to the atmosphere via the Unit No. 6 Stack, at the request of the Oklahoma Department of Environmental Quality in response to Request for Information (RFI), No. 05-AQR-016, issued March 11, 2005. The testing was conducted on June 13 and 14, 2006.

The sampling team consisted of Mr. Bill Mullins and Mr. Scot Jackson. Mr. Mullins was the test team leader.

The sampling followed the procedures set forth in the Code of Federal Regulations, Title 40, Part 60 (40CFR60), Appendix A, Test Methods 1, 2, 3, 4, 5, and 202.

The average emission rate of particulate matter from the Muskogee Unit No. 6 Stack was equal to 0.009 lbs/mmBtu - Front Half. The average emission rate of particulate matter (lbs/mmBtu – Front Half) from the Muskogee Unit No. 6 Stack was 9.00% of the allowable emission rate (0.10 lbs/mmBtu). The average emission rate of particulate matter from the Muskogee Unit No. 6 Stack was equal to 0.019 lbs/mmBtu - Total.

The emission rate of particulate matter from the Muskogee Unit No. 6 Stack was equal to 46.29 lbs/hr. The allowable emission rate of particulate matter from the Unit No. 6 Stack is 212.0 lbs/hr. The particulate matter emission were 21.83 percent of the allowable emission rate. The average emission rate of particulate matter from the Muskogee Unit No. 6 Stack was equal to 98.40 lbs/hr - Total.

The average unit load during the three tests was 539.3 megawatts.

Billy J. Mullins, Jr. P.E., Q.E.P., D.E.E.

AIR SAMPLING ASSOCIATES, INC.

SUMMARY OF RESULTS

The results of the particulate matter tests on the Muskogee Unit No. 6 Stack are presented in Table 1 below and in Table 2 on the following page.

Table 1: Summary of Results

Source	Particulate Matter Emission Rate	Allowable Particulate Matter Emission Rate	Percent of the Allowable
Unit No. 6 Stack			
*- lbs/mmBtu (Front Half)**	0.009	0.10	9.00
- lbs/hr (Font Half)	46.29	212.0	21.83
- lbs/hr (Total)	98.40	212.0	46.42

* Calculated using an F_d Factor of 9,780

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Table 2: Summary of Sampling Results

Run No.	1	2	3	Average
Test Date	06/14/06	06/14/06	06/14/06	-----
Test Time	0809-0928	1046-1158	1358-1511	-----
Flow Rate – DSCFM	1,291,686	1,262,289	1,269,459	1,274,478
Stack Temperature - °F	288	295	312	298
O_2 – % Volume dry	7.3	7.4	7.0	7.2
CO_2 – % Volume dry	12.4	12.0	12.5	12.3
Percent Excess Air	52.2	53.0	48.8	51.3
Moisture Content - %	12.37	12.68	12.52	12.52
Percent Isokinetic	93.7	100.5	100.6	98.3
Particulate Matter				
- gr/dscf (Front Half)	0.0046	0.0039	0.0042	0.0042
- gr/dscf (Total)	0.0096	0.0083	0.0090	0.0090
- lbs/mmBtu (Front Half)*	0.010	0.008	0.009	0.009
- lbs/mmBtu (Total)*	0.021	0.018	0.019	0.019
- lbs/hr (Front Half)	50.84	42.51	45.52	46.29
- lbs/hr (Total)	106.60	90.23	98.38	98.40
Unit Load – Megawatts	546.7	527.9	543.2	539.3

* Calculated using an F_d Factor of 9,780

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DISCUSSION OF SAMPLING RESULTS

The three tests for particulate matter appeared to be valid representations of the actual emissions during the tests. All leak checks performed on the sampling train and the pitot tubes indicated no leaks before or after each test. The indicative parameters calculated from the field data were in reasonable agreement. The measured moisture contents for the three runs were within 1.25% of the mean value. The measured flow rates (DSCFM) for the tests were within 1.35% of the mean value. The rates of sampling for the three tests were within the specified limits (90 to 110 percent isokinetic). The greatest deviation from 100% isokinetic was 6.3%.

The calculated emissions (gr/dscf Total) of particulate matter for the three tests indicated a range of -7.43% to +7.06% deviation from the mean value.

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DESCRIPTION OF PROCESS

Muskogee Unit No. 6 is a Combustion Engineering boiler designed to burn coal with natural gas as an ignition fuel. The boiler is rated for a steam flow of 3,823,000 lbs/hr at 1,000° F superheat and reheat temperatures. Four corners with six elevations of burners are used to fire the boiler.

The steam turbine generator is a Westinghouse unit rated at 550 megawatts gross at 2,400 psi. Turbine control is accomplished using eight governor valves. Four of these are located at the bottom of the high pressure turbine and the remaining four on the top of the turbine.

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DESCRIPTION OF SAMPLING LOCATION

The sampling ports on the Muskogee Unit No. 6 Stack are approximately 277 feet 6 inches above the ground. The sampling ports are located 215 feet (9.15 stack diameters) downstream from the inlet to the stack and 222 feet 6 inches (9.47 stack diameters) upstream from the outlet to the stack.

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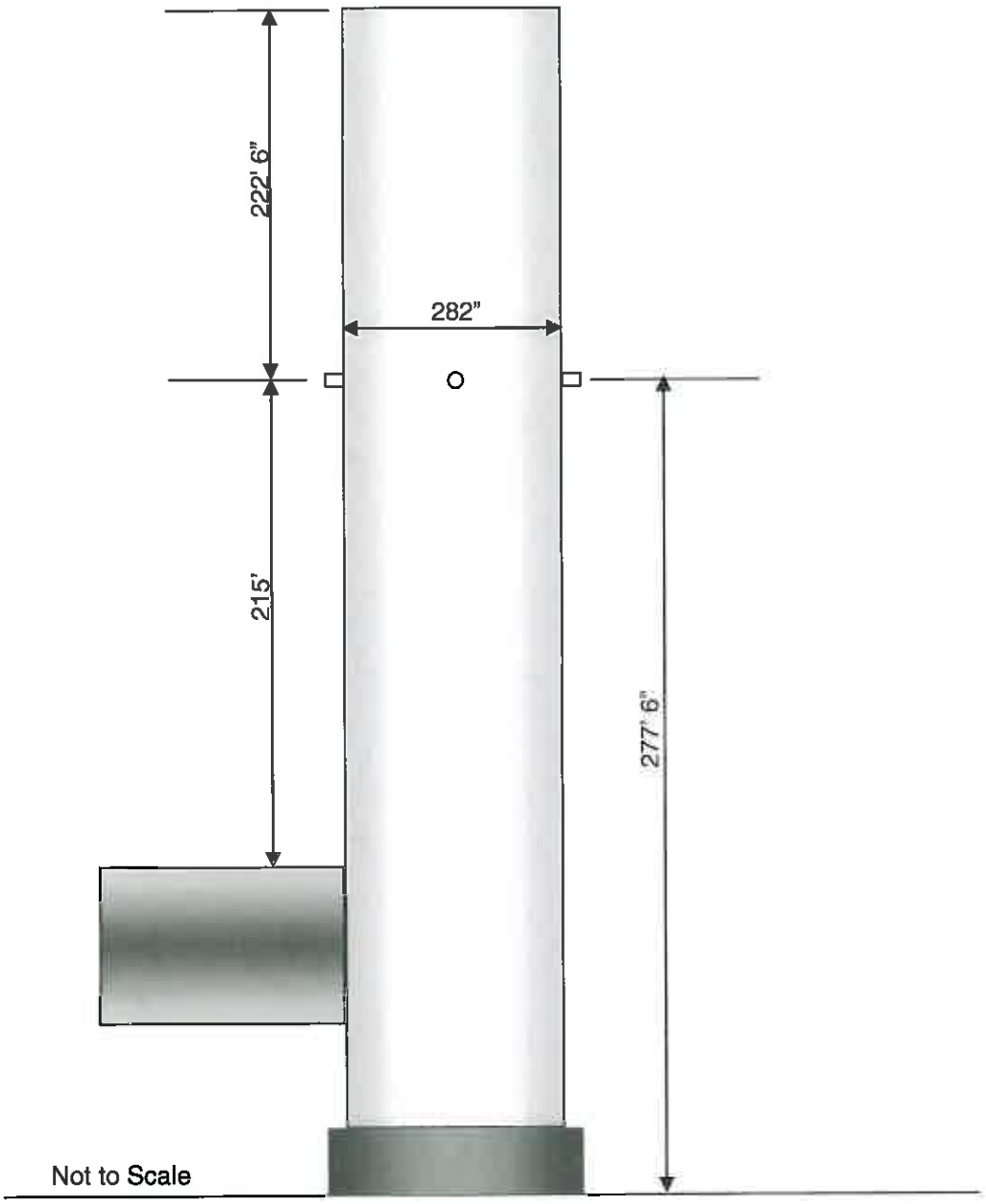
SAMPLING LOCATION

Figure 1: Muskogee Unit No. 6 Stack



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SAMPLING AND ANALYTICAL PROCEDURES

The sampling followed the procedures set forth in 40CFR60, Appendix A, Test Methods 1, 2, 3, 4, 5, and 202.

Three traverse points were sampled from each of the four ports on the Muskogee Unit No. 6 Stack for a total of twelve traverse points. All traverse points were previously checked for cyclonic flow and none was found to be present. For each run, samples of five minute duration were taken at each of the twelve traverse points for a total sampling time of sixty minutes.

The pitot tube lines were checked for leaks before and after each test under a vacuum and a pressure. The lines were also checked for clearance and the manometer was zeroed before each test.

The sampling train was leak checked at the end of the sampling probe at 15" of mercury vacuum before each test, and again at the conclusion of each test at the highest vacuum recorded during sampling. This was done to predetermine the possibility of a diluted sample.

The "front-half" of the sampling train contained the following components:

Stainless steel nozzle
Stainless steel probe extension
Heated glass lined probe @ 248°F ± 25°F
Heated glass fiber filter @ 248°F ± 25°F

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The "back-half" of the sampling train contained the following components:

Table 3: Reference Method 202 Sampling Train

Impinger No.	Impinger Type	Impinger Contents	Amount	Parameter Collected
1	Modified	D.I. H_2O	100 ml	H_2O / C.P.M.
2	Greenburg-Smith	D.I. H_2O	100 ml	H_2O / C.P.M.
3	Modified	Empty	-----	H_2O / C.P.M.
4	Modified	6% H_2O_2	200 ml	H_2O
5	Modified	Silica Gel	250 g	H_2O

At the completion of each run, the "back-half" of the sampling train was purged with nitrogen for 60 minutes at a rate of 20 liters per minute.

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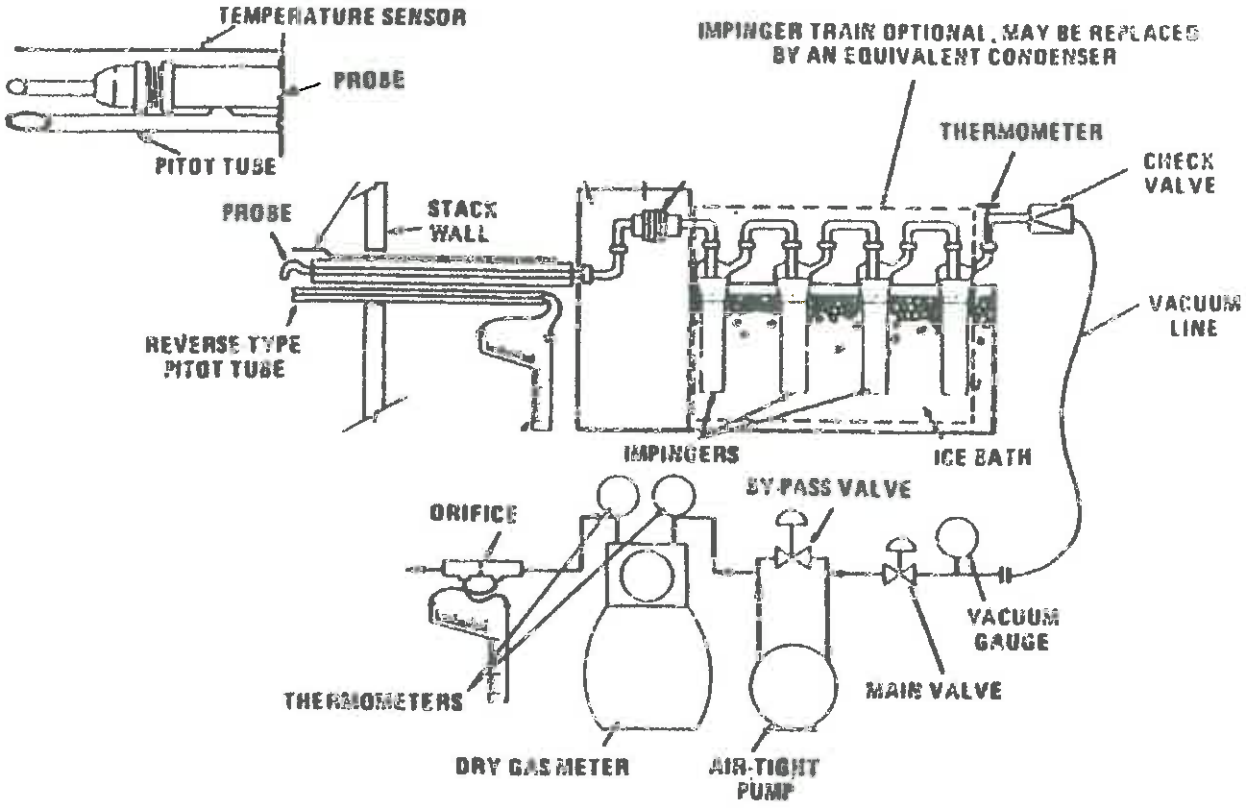
Figure 2: EPA Methods 1, 2, 3, 4, 5, and 202 Sampling Train



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TEST NARRATIVE

Personnel from Air Sampling Associates, Inc. arrived at the OG+E Electric Services, Muskogee Power Plant, located near Muskogee, Oklahoma, at 3:00 p.m., on Tuesday, June 13, 2006. The sampling equipment was moved onto the Unit No. 6 Stack before securing for the night at 5:00 p.m.

On Wednesday, June 14, 2006 personnel returned to the plant at 6:45 a.m. The sampling equipment was prepared for testing and the first test for particulate matter began at 8:09 a.m. Testing continued until the completion of the third test at 3:11 p.m.

The equipment was moved off the stack and loaded into the sampling trailer. The samples were purged, recovered and taken to Air Sampling Associates, Inc.'s office in Lewisville, Texas, for analysis and evaluation.

Operations at OG+E Electric Services, Muskogee Power Plant, Unit No. 6 Stack, located near Muskogee, Oklahoma, were completed at 6:00 p.m., on Wednesday, June 14, 2006.

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APPENDICES

AIR SAMPLING ASSOCIATES, INC.

Appendix A:

Location of Traverse Points

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Appendix A:

Location of Traverse Points
Muskogee Unit No. 6 Stack

The sampling ports are located 215 feet (9.15 stack diameters) downstream from the inlet to the stack and 222 feet 6 inches (9.47 stack diameters) upstream from the outlet to the stack. The locations of the traverse points were calculated as follows:

Table 4: Location of Traverse Points

Port & Wall Thickness	**=**	**15 inches**
Inside Stack Diameter	**=**	**282 inches**
Point Number*	**Percent of Stack Diameter**	**Distance from Wall**
1	**4.4**	**12 7/16"**
2	**14.6**	**41 3/16"**
3	**29.6**	**83 1/2"**

*** Calculated as 1/2 of a six point traverse.**

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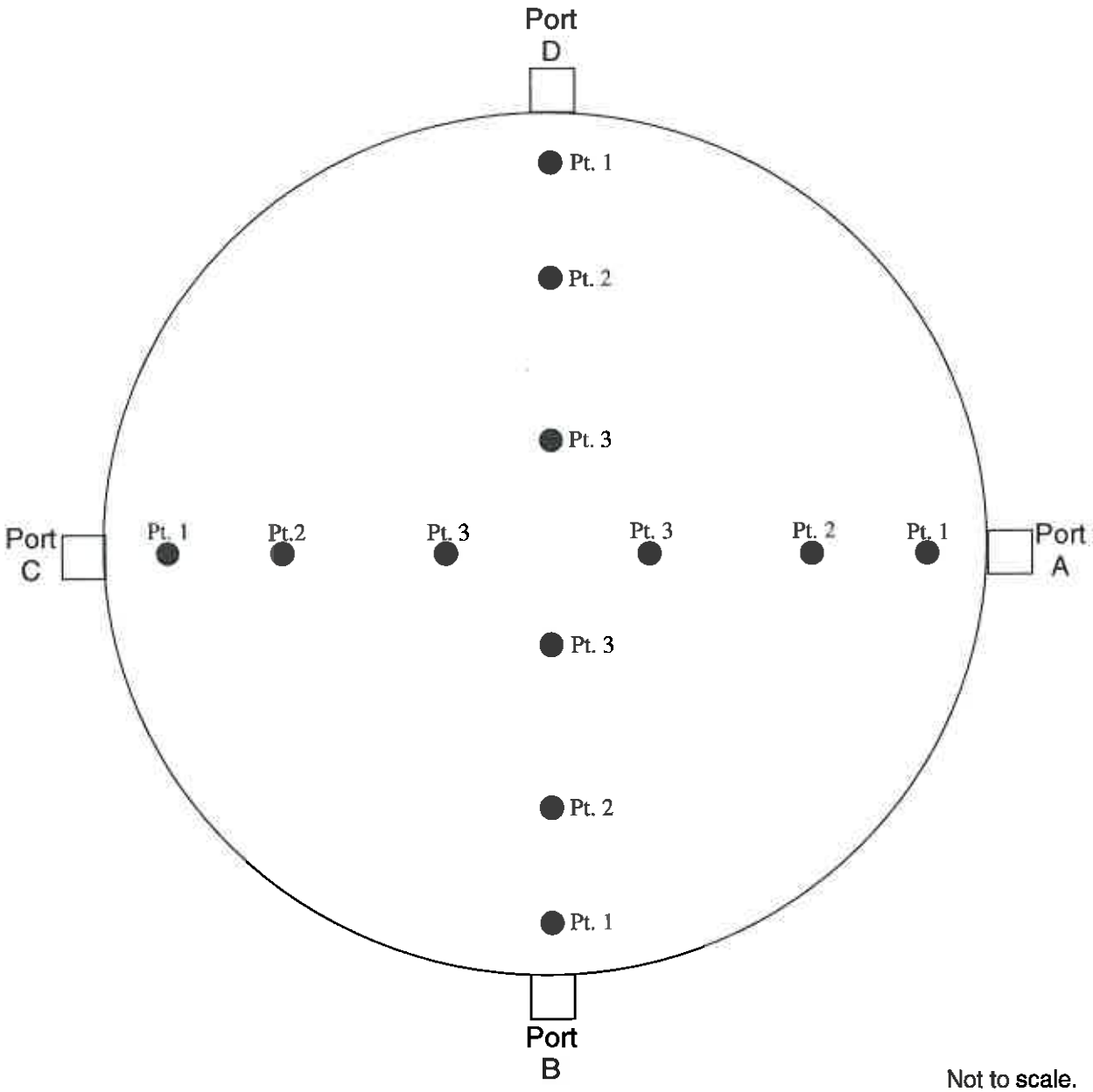
Appendix A:

Figure 3: Location of Traverse Points
Muskogee Unit No. 6 Stack



Not to scale.

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Appendix B:

Nomenclature and Equations for Calculation of Source Emissions

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Nomenclature For Flow Rate and Moisture Calculations

Symbol	English Units	Metric Units	Description
A_s	$in.^2$	m^2	Stack Area
C_{an}	gr/dscf*	g/dscm*	Particulate – probe, cyclone, and filter
C_{ao}	gr/dscf*	g/dscm*	Particulate –total
C_{at}	gr/CF @ stack conditions	g/m3	Particulate – probe, cyclone, and filter
C_{au}	gr/CF @ stack conditions	g/m3	Particulate – total
C_{aw}	lbs/hr	kg/hr	Particulate – probe, cyclone, and filter
C_{ax}	lbs/hr	kg/hr	Particulate - total
C_p			Pitot Tube Calibration Factor
D_n	in.	m	Sampling Nozzle Diameter
%EA			Percent Excess Air at Sampling Point
g	32.2 ft/sec^2		Acceleration of gravity
%I			Percent Isokinetic
%M			Percent Moisture in the Stack Gas by Volume
M_d			Mole Fraction of Dry Gas
m_f	mg	mg	Particulate – probe, cyclone, and filter
mt	mg	mg	Particulate – total
M_{water}	18 lb/lb-mole		Molecular Weight of Water
MW	lb/lb-mole	g/g-mole	Molecular Weight of Stack Gas
MW_{air}	28.84 lb/lb-mole		Molecular Weight of Air

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Symbol	English Units	Metric Units	Description
MW_d	lb/lb-mole	g/g-mole	Molecular Weight of Dry Stack Gas
P_b	"Hg Absolute	mm Hg	Barometric Pressure
P_m	"H_2O	mm H_2O	Orifice Pressure drop
Ps	"Hg Absolute	mm Hg	Stack Pressure
ΔP	"H_2O	mm H_2O	Velocity Head of Stack Gas
P_{std}	29.92" Hg	760 mm Hg	Standard Barometric Pressure
Q_a	ACFM	m^3/hr	Stack Gas Volume at Actual Stack Conditions
Q_s	DSCFM*	dscm/hr*	Stack Gas Volume at 29.92" Hg, 528° R, dry
R	21.83" Hg-ft^3/lb-mole °R		Universal Gas Constant
T_m	°F	°C	Average Gas Meter Temperature
T_t	min	min	Net Time of Test
T_s	°F	°C	Stack Temperature
T_{std}	528 °R	293 °K	Standard Temperature
V_m	ft^3	m^3	Volume of Dry Gas Sampled @ Meter Conditions
Vm_{std}	dscf*	dscm*	Volume of Dry Gas Sampled @ Standard Conditions
V_s	fpm	m/sec	Stack Velocity @ Stack Conditions
V_w	ml	ml	Total Water Collected in Impingers and Silica Gel
Vw_{gas}	scf*	scm*	Volume of Water Vapor Collected @ Standard Conditions
ρ_{air}	0.0748 lbs/ft^3		Density of Air

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Symbol	English Units	Metric Units	Description
ρ_{water}	1 g/ml		Density of Water
ρ_{man}	62.32 lbs/ft^3		Density of Manometer Oil
			(Inches of Water)

Standard Conditions: 29.92" Hg, 68° F (760 mm Hg, 20 °C)

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Example Calculations

1. Volume of dry gas sampled at standard conditions. *

$$V_{mstd} = V_m \left(\frac{T_{std}}{T_m + 460} \right) \left[\frac{P_b + \frac{P_m}{13.6}}{P_{std}} \right]$$

$$V_{mstd} = 17.65\ V_m \left[\frac{P_b + \frac{P_m}{13.6}}{T_m + 460} \right] = \text{dscf}$$

V_{mstd} = dscf x 0.028317 = dscm

2. Volume of water vapor collected at standard conditions. *

$$V_{wgas} = \frac{(V_w - gms\ SO_2 - gms\ H_2S)\ \rho_{water}\ RT_{std}}{P_{std}\ M_{water}\ 453.6}$$

$$V_{wgas} = 0.0472\ (V_w - gms\ SO_2 - gms\ H_2S) = scf$$

$V_{wgas} = scf\ x\ 0.028317 = scm$

3. Percent moisture in stack gas.

$$\%M = \frac{V_{wgas}}{V_{mstd} + V_{wgas}}\ x\ 100 = \%$$

* 29.92" Hg, 68° F (760 mm Hg, 20 °C)

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4. Mole fraction of dry gas.

$$M_d = \frac{100 - \%M}{100}$$

5. Average molecular weight of dry stack gas.

$$MW_d = \left[\%CO_2 \times \frac{44}{100}\right] + \left[\%O_2 \times \frac{32}{100}\right] + \left[\%N_2 \times \frac{28}{100}\right] + \left[\%CO \times \frac{28}{100}\right] = lb/lb\text{-}mole$$

$$= g/g\text{-}mole$$

6. Molecular weight of stack gas.

$$MW = MW_d \times M_d + 18\,(1 - M_d) = \frac{lb}{lb\text{-}mole} = g/g\text{-}mole$$

7. Percent excess air at sampling point.

$$\%EA = \frac{100\,[\%O_2 - (0.5\,\%CO)]}{0.265\,(\%N_2) - [\%O_2 - (0.5\,\%CO)]}$$

8. Stack Pressure.

$$P_s = P_b + \frac{Stack\ Pressure\ "H_2O}{13.6} = "Hg\ Absolute$$

$$P_s = "Hg\ Abs. \times 25.4 = mm\ Hg$$

9. Stack velocity at stack conditions.

$$V_s = C_p\,60\left[\frac{2g \times \rho_{man} \times P_{std} \times MW_{air} \times (T_s + 460) \times \Delta P}{12 \times \rho_{air} \times P_s \times MW \times T_{std}}\right]^{1/2}$$

$$V_s = 5{,}123.8\,C_p\left[\frac{(T_s + 460)}{P_s \times MW}\right]^{1/2} \sqrt{\Delta P}\ \text{average} = fpm$$

$$V_s = fpm \times 0.00508 = m/sec$$

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10. Dry stack gas volume at standard conditions. *

$$Q_s = \frac{1}{144} V_s \times A_s \times M_d \times \frac{T_{std}}{T_s + 460} \times \frac{P_s}{P_{std}}$$

$$Q_s = \frac{0.123\, V_s \times A_s \times M_d \times P_s}{T_s + 460} = DSCFM$$

$$Q_s = DSCFM \times 1.6990 = dscm/hr$$

11. Actual stack gas volume at stack conditions.

$$Q_a = \frac{V_s \times A_s}{144} = ACFM$$

$$Q_a = ACFM \times 1.6990 = m^3/hr$$

12. Percent Isokinetic

$$\%I = \frac{V_{mstd} \times (T_s + 460) \times P_{std} \times 100 \times 144\ in.^2/ft^2}{M_d \times T_{std} \times P_s \times T_t \times V_s \left(\frac{\Pi \times D_n^2}{4}\right)}$$

$$\%I = \frac{1039 \times V_{mstd} \times (T_s + 460)}{M_d \times P_s \times T_t \times V_s \times D_n^2}$$

*29.92" Hg, 68° F (760 mm Hg, 20 °C)

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13. Particulate – Probe, cyclone, and filter.

$$C_{an} = \frac{m_f}{V_{mstd}} x \frac{1\,gr}{64.8\,mg}$$

$$C_{an} = 0.0154 \times \frac{mf}{V_{mstd}}\ gr/dscf\ *$$

$$C_{an} = gr/dscf \times 2.290 = g/dscm\ *$$

14. Particulate total.

$$C_{ao} = 0.0154 \times \frac{m_t}{V_{mstd}} = gr\,/\,dscf\ *$$

$$C_{ao} = gr/dscf \times 2.290 = g/dscm\ *$$

15. Particulate – probe, cyclone, and filter at stack conditions.

$$C_{at} = C_{an} \times \frac{P_s}{P_{std}} \times \frac{(T_{std})}{(T_s + 460)} \times M_d$$

$$C_{at} = \frac{17.65 \times C_{an} \times Ps \times Md}{Tx + 460} = gr/CF$$

$$C_{at} = gr/CF \times 2.290 = g/m^3$$

16. Particulate – total, at stack conditions.

$$C_{au} = \frac{17.65 \times C_{ao} \times P_s \times M_d}{T_s + 460} = gr/CF$$

$$C_{au} = gr/CF \times 2.290 = g/m^3$$

* 29.92" Hg, 68° F (760 mm Hg, 20 °C)

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Emission Rate Calculations

$$lbs/mmBtu = \frac{\frac{gr/dscf}{7{,}000} \times F_d \times 20.9}{(20.9 - O_2\%)}$$

F_d = Oxygen based F factor

Fuel	F_d factor
Coal	9,780 dscf*/mmBtu

SOURCE EMISSION SURVEY

JOB NUMBER: 06-032
JOB NAME: OG + E Electric Services
LOCATION: Muskogee, OK
UNIT TESTED: Unit No. 6 Stack

SOURCE EMISSION CALCULATIONS

			RUN NUMBER		
SYMBOL	DESCRIPTION	UNITS	1	2	3
DATE			06/14/06	06/14/06	06/14/06
BEGIN TIME			0809	1046	1358
END TIME			0928	1158	1511
P(b)	BAROMETRIC PRESSURE	"Hg Abs.	29.49	29.58	29.48
		(mm Hg)	(749.00)	(751.00)	(749.00)
P(m)	ORIFICE PRESSURE DROP	"H2O	3.000	3.371	3.496
		(mm H2O)	(76.200)	(85.600)	(88.800)
	DGM CALIBRATION FACTOR		0.992	0.992	0.992
V(m)	VOLUME DRY GAS SAMPLED	ft.^3	53.618	56.592	57.672
	@ METER CONDITIONS	(m^3)	(1.518)	(1.603)	(1.633)
	LEAK CHECK VOLUME	ft.^3	0.000	0.000	0.000
T(m)	AVERAGE GAS METER	DEG.F	81	87	92
	TEMPERATURE	(DEG.C)	(27)	(31)	(33)
V(m[std])*	VOLUME DRY GAS SAMPLED	DSCF	51.972	54.467	54.836
	@ STANDARD CONDITIONS*	(DSCM)	(1.472)	(1.542)	(1.553)
V(w)	TOTAL WATER COLLECTED,	ml	155.5	167.6	166.3
	IMPINGERS & SILICA GEL				
V(w[gas])	VOLUME WATER VAPOR	SCF	7.340	7.911	7.849
	COLLECTED @ STANDARD	(SCM)	(0.208)	(0.224)	(0.222)
	CONDITIONS*				
%M	MOISTURE IN STACK GAS	%	12.37	12.68	12.52
	BY VOLUME				
Md	MOL FRACTION OF DRY GAS		0.8763	0.8732	0.8748
Tt	NET TIME OF TEST	MINUTES	60	60	60

* 68 Deg.F, 29.92 "Hg (20 Deg.C, 760 mm Hg)

SOURCE EMISSION CALCULATIONS

JOB NUMBER: 06-032
JOB NAME: OG + E Electric Services
LOCATION: Muskogee, OK
UNIT TESTED: Unit No. 6 Stack

			RUN NUMBER		
SYMBOL	DESCRIPTION	UNITS	1	2	3
CO2		%	12.4	12.0	12.5
O2		%	7.3	7.4	7.0
CO		%	0.0	0.0	0.0
N2		%	80.3	80.6	80.5
%EA	EXCESS AIR @ SAMPLING POINT	%	52.2	53.0	48.8
MWd	MOLECULAR WEIGHT OF DRY STACK GAS	LB/LB-MOLE (g/g-MOLE)	30.28 (30.28)	30.22 (30.22)	30.28 (30.28)
MW	MOLECULAR WEIGHT OF STACK GAS	LB/LB-MOLE (g/g-MOLE)	28.76 (28.76)	28.67 (28.67)	28.74 (28.74)
Cp	PITOT TUBE CALIBRATION		0.821	0.821	0.821
DELTA P	VELOCITY HEAD OF STACK GAS	"H2O (mm H20)	1.525 (38.700)	1.471 (37.400)	1.525 (38.700)
DELTA P ^(1/2)		"H2O	1.233	1.211	1.233
Ts	STACK TEMPERATURE	DEG. F (DEG. C)	288 (142)	295 (146)	312 (156)
Ps	STACK PRESSURE	"Hg Abs. (mm Hg) "H20	29.44 (748.00) -0.72	29.53 (750.00) -0.64	29.43 (748.00) -0.63
Vs	STACK VELOCITY @ STACK CONDITIONS	FPM (m/SEC.)	4,875 (25)	4,811 (24)	4,955 (25)
As	STACK AREA	(SQ.INCHES) (SQ.METERS)	62,458 (40)	62,458 (40)	62,458 (40)
Qs	DRY STACK GAS VOLUME @ STANDARD CONDITIONS*	DSCFM (DSCM/HR)	1,291,686 (2,194,575)	1,262,289 (2,144,629)	1,269,459 (2,156,811)
Qa	ACTUAL STACK GAS VOLUME @ STACK CONDITIONS	ACFM (m^3/HR)	2,114,518 (3,592,566)	2,086,570 (3,545,082)	2,149,286 (3,651,637)
Dn	SAMPLING NOZZLE DIAM.	IN. (m)	0.239 (0.006)	0.239 (0.006)	0.239 (0.006)
%I	PERCENT ISOKINETIC	%	93.7	100.5	100.6

* 68 Deg.F, 29.92 "Hg (20 Deg.C, 760 mm Hg)

SOURCE EMISSION CALCULATIONS

JOB NUMBER: 06-032
JOB NAME: OG + E Electric Services
LOCATION: Muskogee, OK
UNIT TESTED: Unit No. 6 Stack

			RUN NUMBER		
SYMBOL	DESCRIPTION	UNITS	1	2	3
Mf	PARTICULATE - PROBE, CYCLONE AND FILTER	mg	15.5	13.9	14.9
Mt	PARTICULATE - TOTAL	mg	32.5	29.5	32.2
Can	PARTICULATE - PROBE, CYCLONE AND FILTER	gr/DSCF* (g/DSCM)	0.0046 (0.0105)	0.0039 (0.0090)	0.0042 (0.0096)
Cao	PARTICULATE - TOTAL	gr/DSCF* (g/DSCM)	0.0096 (0.0221)	0.0083 (0.0191)	0.0090 (0.0207)
Cat	PARTIC.-PROBE, CYCLONE AND FILTER @ STACK COND.	gr/CF (g/m3)	0.0028 (0.0064)	0.0024 (0.0055)	0.0025 (0.0057)
Cau	PARTICULATE - TOTAL @ STACK CONDITIONS	gr/CF (g/m3)	0.0059 (0.0135)	0.0050 (0.0115)	0.0053 (0.0121)
Caw	PARTICULATE - PROBE, CYCLONE AND FILTER	LBS/HR (Kg/HR)	50.84 (23.06)	42.51 (19.28)	45.52 (20.65)
Cax	PARTICULATE - TOTAL	LBS/HR (Kg/HR)	106.60 (48.36)	90.23 (40.93)	98.38 (44.63)

* 68 Deg.F, 29.92 "Hg (20 Deg.C, 760 mm Hg)

AIR SAMPLING ASSOCIATES, INC.

Appendix C:

Calibration Data

AIR SAMPLING ASSOCIATES, INC.

Appendix C

Table 5: Calibration Data

Pre-test Calibrations:

Equipment	Calibration Factor	Calibration Date
Dry Gas Meter 1-1	0.992	05/22/06
Digital Temperature Indicator 1-1		05/22/06
Dry Gas Meter 1-1 Orifice		05/22/06
Pitot Tube 1-4	0.821	05/22/06
Nozzle 1-3	0.239	03/03/06
Barometer 1	NIST Traceable	05/22/06

Post-test Calibrations:

Equipment	Calibration Factor	Calibration Date
Dry Gas Meter 1-1	0.993	06/15/06
Pitot Tube 1-4	0.823	06/15/06
Nozzle 1-3	0.240	06/15/06
Barometer 1	NIST Traceable	06/23/06

AIR SAMPLING ASSOCIATES, INC.

Calibration Data

Dry Gas Meter Calibration

Meter Console No. ASAI 1-1

Date Calibration Performed: 05/22/06

ΔH Setting (" H_2O)	C_{DG}
0.50	0.998
1.00	0.994
1.50	0.993
2.00	0.996
3.00	0.986
4.00	0.986
Average	0.992

Variation +: 0.60%

Variation -: -0.60%

Certified by: Scot Jackson 05/22/06

Calibrator (Signature / Date)

Bill Hefley 05/22/06

QA Officer (Signature / Date)

AIR SAMPLING ASSOCIATES, INC.

Calibration Data

Dry Gas Meter Calibration

Meter Console No. ASAI 1-1

Date Calibration Performed: 05/22/06

Run 1 at 0.5" ΔH Pb = 29.69 " Hg

Wet Test Meter C_f = 1.018 Console Pump Vacuum = -5.0 " Hg

	Wet Test Meter No. ASAI-0							*Dry Gas Meter*							
	Time	Meter Reading		Temp.		P_m		Meter Reading		Temperature In		Out		P_m	
End	10:51	5.355	cf	83	°F	-0.1	" H_2O	297.75	cf	84	°F	82	°F	0.50	" H_2O
Start	10:38	0.000	cf	83	°F	-0.1	" H_2O	292.303	cf	82	°F	81	°F	0.50	" H_2O
Average		5.355	cf	83	°F	-0.1	" H_2O	5.447	cf	83	°F	82	°F	0.50	" H_2O

$$\text{Wet Test Meter } V_{mstd} = 17.65 \times V_m \left[\frac{P_b + \frac{P_m}{13.6}}{(T_m + 460)} \right] \times C_f = \underline{5.260} \text{ dcsf}$$

$$\text{Dry Gas Meter } V_{mstd} = 17.65 \times V_m \left[\frac{P_b + \frac{P_m}{13.6}}{(T_m + 460)} \right] = \underline{5.270} \text{ dcsf}$$

$$\text{Calibration Factor } (C_{DG}) = \frac{\text{Wet Test Meter } V_{mstd}}{\text{Dry Gas Meter } V_{mstd}} = \underline{0.998}$$

AIR SAMPLING ASSOCIATES, INC.

Calibration Data

Dry Gas Meter Calibration

Meter Console No. ASAI 1-1

Date Calibration Performed: 05/22/06

Run 1 at 1.0" ΔH Pb = 29.69 " Hg

Wet Test Meter C_f = 1.018 Console Pump Vacuum = -5.0 " Hg

	Wet Test Meter No. ASAI-0							*Dry Gas Meter*						
	Time	Meter Reading		Temp.		P_m		Meter Reading		Temperature In		Out		P_m	
End	11:06	5.598	cf	83	°F	-0.1	" H_2O	303.478	cf	86	°F	83	°F	1.00	" H_2O
Start	10:56	0.000	cf	83	°F	-0.1	" H_2O	297.750	cf	84	°F	82	°F	1.00	" H_2O
Average		5.598	cf	83	°F	-0.1	" H_2O	5.728	cf	85	°F	83	°F	1.00	" H_2O

$$\textit{Wet Test Meter } V_{msd} = 17.65 \times V_m \left[\frac{P_b + \frac{P_m}{13.6}}{(T_m + 460)} \right] \times C_f = \underline{5.498} \text{ dcsf}$$

$$\textit{Dry Gas Meter } V_{msd} = 17.65 \times Vm \left[\frac{P_b + \frac{P_m}{13.6}}{(T_m + 460)} \right] = \underline{5.534} \text{ dcsf}$$

$$\textit{Calibration Factor } (C_{DG}) = \frac{\textit{Wet Test Meter } V_{msd}}{\textit{Dry Gas Meter } V_{msd}} = \underline{0.994}$$

AIR SAMPLING ASSOCIATES, INC.

Calibration Data

Dry Gas Meter Calibration

Meter Console No. ASAI 1-1

Date Calibration Performed: 05/22/06

Run 1 at 1.5" ΔH Pb = 29.69 " Hg

Wet Test Meter C_f = 1.018 Console Pump Vacuum = -5.0 " Hg

	Wet Test Meter No. ASAI-0							*Dry Gas Meter*						
	Time	Meter Reading		Temp.		P_m		Meter Reading		Temperature In		Out		P_m	
End	11:24	10.190	cf	83	°F	-0.2	" H_2O	313.936	cf	90	°F	85	°F	1.50	" H_2O
Start	11:09	0.000	cf	83	°F	-0.2	" H_2O	303.478	cf	86	°F	83	°F	1.50	" H_2O
Average		10.190	cf	83	°F	-0.2	" H_2O	10.458	cf	88	°F	84	°F	1.50	" H_2O

$$\textit{Wet Test Meter } V_{mstd} = 17.65 \times V_m \left[\frac{P_b + \frac{P_m}{13.6}}{(T_m + 460)} \right] \times C_f = \underline{10.006} \text{ dcsf}$$

$$\textit{Dry Gas Meter } V_{mstd} = 17.65 \times Vm \left[\frac{P_b + \frac{P_m}{13.6}}{(T_m + 460)} \right] = \underline{10.074} \text{ dcsf}$$

$$\textit{Calibration Factor } (C_{DG}) = \frac{\textit{Wet Test Meter } V_{mstd}}{\textit{Dry Gas Meter } V_{mstd}} = \underline{0.993}$$

AIR SAMPLING ASSOCIATES, INC.

Calibration Data

Dry Gas Meter Calibration

Meter Console No. ASAI 1-1

Date Calibration Performed: 05/22/06

Run 1 at 2.0" ΔH Pb = 29.69 " Hg

Wet Test Meter C_f = 1.018 Console Pump Vacuum = -5.0 " Hg

	Wet Test Meter No. ASAI-0							*Dry Gas Meter*							
	Time	Meter Reading		Temp.		P_m		Meter Reading		Temperature In		Out		P_m	
End	11:49	10.148	cf	83	°F	-0.3	" H_2O	324.349	cf	93	°F	86	°F	2.00	" H_2O
Start	11:27	0.000	cf	83	°F	-0.3	" H_2O	313.936	cf	89	°F	85	°F	2.00	" H_2O
Average		10.148	cf	83	°F	-0.3	" H_2O	10.413	cf	91	°F	86	°F	2.00	" H_2O

$$\text{Wet Test Meter } V_{mstd} = 17.65 \times V_m \left[\frac{P_b + \frac{P_m}{13.6}}{(T_m + 460)} \right] \times C_f = \underline{9.963} \text{ dcsf}$$

$$\text{Dry Gas Meter } V_{mstd} = 17.65 \times Vm \left[\frac{P_b + \frac{P_m}{13.6}}{(T_m + 460)} \right] = \underline{10.002} \text{ dcsf}$$

$$\text{Calibration Factor } (C_{DG}) = \frac{\text{Wet Test Meter } V_{mstd}}{\text{Dry Gas Meter } V_{mstd}} = \underline{0.996}$$

AIR SAMPLING ASSOCIATES, INC.

Calibration Data
Dry Gas Meter Calibration

Meter Console No. ASAI 1-1

Date Calibration Performed: 05/22/06

Run 1 at 3.0" ΔH Pb = 29.69 " Hg

Wet Test Meter C_f = 1.018 Console Pump Vacuum = -5.0 " Hg

	Wet Test Meter No. ASAI-0							*Dry Gas Meter*							
	Time	Meter Reading		Temp.		P_m		Meter Reading		Temperature In		Out		P_m	
End	12:57	11.506	cf	87	°F	-0.4	" H_2O	336.183	cf	92	°F	88	°F	3.00	" H_2O
Start	12:45	0.000	cf	87	°F	-0.4	" H_2O	324.349	cf	89	°F	88	°F	3.00	" H_2O
Average		11.506	cf	87	°F	-0.4	" H_2O	11.834	cf	91	°F	88	°F	3.00	" H_2O

$$\text{Wet Test Meter } V_{mstd} = 17.65 \times V_m \left[\frac{P_b + \frac{P_m}{13.6}}{(T_m + 460)} \right] \times C_f = \underline{11.210} \text{ dcsf}$$

$$\text{Dry Gas Meter } V_{mstd} = 17.65 \times Vm \left[\frac{P_b + \frac{P_m}{13.6}}{(T_m + 460)} \right] = \underline{11.374} \text{ dcsf}$$

$$\text{Calibration Factor } (C_{DG}) = \frac{\text{Wet Test Meter } V_{mstd}}{\text{Dry Gas Meter } V_{mstd}} = \underline{0.986}$$

AIR SAMPLING ASSOCIATES, INC.

Calibration Data

Dry Gas Meter Calibration

Meter Console No. ASAI 1-1

Date Calibration Performed: 05/22/06

Run 1 at 4.0" ΔH Pb = 29.67 " Hg

Wet Test Meter C_f = 1.018 Console Pump Vacuum = -5.0 " Hg

	Wet Test Meter No. ASAI-0							*Dry Gas Meter*							
	Time	Meter Reading		Temp.		P_m		Meter Reading		Temperature In		Out		P_m	
End	13:11	11.009	cf	87	°F	-0.5	" H_2O	347.510	cf	96	°F	89	°F	4.00	" H_2O
Start	13:01	0.000	cf	87	°F	-0.5	" H_2O	336.183	cf	91	°F	88	°F	4.00	" H_2O
Average		11.009	cf	87	°F	-0.5	" H_2O	11.327	cf	94	°F	89	°F	4.00	" H_2O

$$\text{Wet Test Meter } V_{mstd} = 17.65 \times V_m \left[\frac{P_b + \frac{P_m}{13.6}}{(T_m + 460)} \right] \times C_f = \underline{10.716} \text{ dcsf}$$

$$\text{Dry Gas Meter } V_{mstd} = 17.65 \times Vm \left[\frac{P_b + \frac{P_m}{13.6}}{(T_m + 460)} \right] = \underline{10.872} \text{ dcsf}$$

$$\text{Calibration Factor } (C_{DG}) = \frac{\text{Wet Test Meter } V_{mstd}}{\text{Dry Gas Meter } V_{mstd}} = \underline{0.986}$$

AIR SAMPLING ASSOCIATES, INC.

Calibration Data

Digital Temperature Indicator Calibration

DTI Unit No. ASAI 1-1

Date Calibration Performed: 05/22/06

Reference Point	Time	ASTM Reference Thermometer (°F)	DTI (°F)
Ice Bath	6:50	33° F	31° F
Ambient Air	6:46	79° F	79° F
Boiling Water	7:37	207° F	208° F
Oven	16:58	233° F	235° F
Oven	16:48	298° F	297° F
Oven	16:43	348° F	348° F
Oven	16:35	395° F	395° F

Meter Adjusted? Yes

ASTM Reference Thermometer:

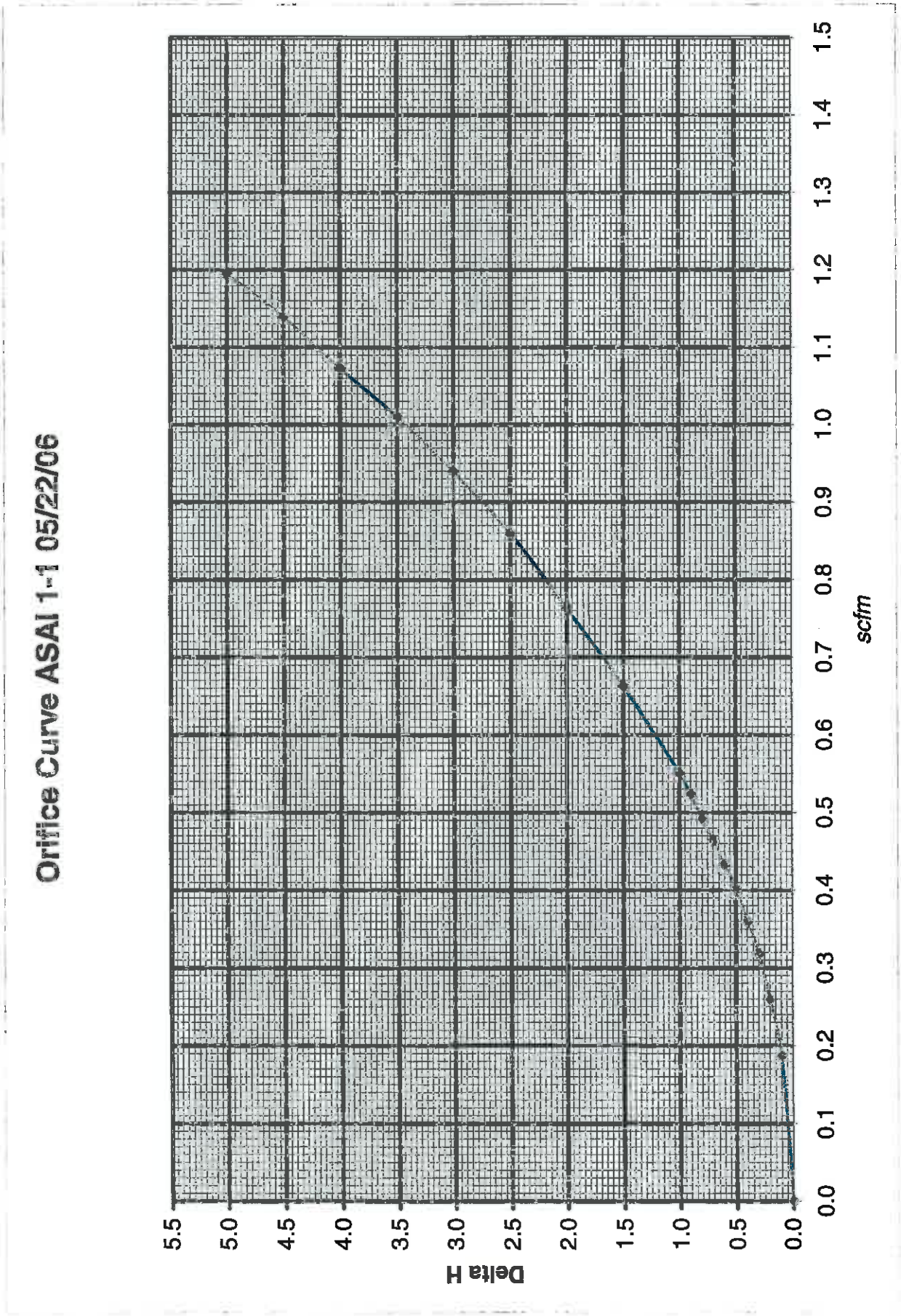
SN: 5963	Range:	+18+89°F
SN: 1853	Range:	+205+310°F
SN: 992	Range:	+295+400°F

Certified by: Scot Jackson 05/22/06

Calibrator (Signature / Date)

Bill Hefley 05/22/06

QA Officer (Signature / Date)


Orifice Curve ASAI 1-1 05/22/06
Delta H
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
1.2
1.3
1.4
1.5
scfm

AIR SAMPLING ASSOCIATES, INC.

CALIBRATION DATA
PITOT TUBE CALIBRATION DATA

Date: 05/22/06 Time: 13:50

I.D. #: ASAI 1-4 T_s: 90 °F

C_{pstd}: 0.990 Pb: 29.66 " Hg

fps Mark	Desired Calibration Standard	Calibration Standard Start	Calibration Standard End	√ Standard Average	High	√ High	Cal. Factor	Low	√ Low	Cal. Factor
20	0.09	0.09	0.09	0.300	0.13	0.361	0.824	0.13	0.361	0.824
30	0.20	0.20	0.20	0.447	0.29	0.539	0.822	0.29	0.539	0.822
40	0.35	0.35	0.35	0.592	0.51	0.714	0.820	0.51	0.714	0.820
50	0.54	0.54	0.54	0.735	0.78	0.883	0.824	0.78	0.883	0.824
60	0.78	0.78	0.78	0.883	1.15	1.072	0.815	1.15	1.072	0.815
70	1.07	1.10	1.10	1.049	1.60	1.265	0.821	1.60	1.265	0.821
80	1.39	1.40	1.40	1.183	2.05	1.432	0.818	2.05	1.432	0.818
90	1.76	1.75	1.75	1.323	2.55	1.597	0.820	2.55	1.597	0.820
50	0.54	0.54	0.54	0.735	0.78	0.883	0.824	0.78	0.883	0.824
50	0.54	0.54	0.54	0.735	0.78	0.883	0.824	0.78	0.883	0.824
Average							0.821			0.821

Summary of Results:

Normal high side calibraiton factor: 0.821

variation +: 0.37%

variation -: -0.73%

Normal low side calibration factor: 0.821

variation +: 0.37%

variation -: -0.73%

Certification:

I certify that the Type S pitot tube, the standard type pitot tube, and the calibration setup meet or exceed all specifications, criteria and/or applicable design features and hereby assign a pitot tube calibration factor C_p of: 0.821

Certified by: *Patrick Sebakovich 5/22/06*
Calibrator (Signature/Date)

Bill Hefley 5/22/06
QA Officer (Signature/Date)

AIR SAMPLING ASSOCIATES, INC.

Calibration Data
Nozzle Calibration

Nozzle Set No. ASAI 1-
Date Calibration Performed: 03/03/06

	-1	-2	-3	-4	-5	-6	-7	-8
Measurement 1			0.241					
Measurement 2			0.238					
Measurement 3			0.240					
Measurement 4			0.241					
Measurement 5			0.240					
Measurement 6			0.240					
Measurement 7			0.240					
Measurement 8			0.239					
Measurement 9			0.234					
Measurement 10			0.238					
Average			0.239					

Scot Jackson 03/03/06
Calibrator (Signature / Date)

Bill Hefley 03/03/06
QA Officer (Signature / Date)

AIR SAMPLING ASSOCIATES, INC.

Calibration Data

Barometer Calibration Data

Date:	05/22/2006	Time:	14:20
I.D. #:	ASAI – 1	Temperature:	90

Mercury Barometer ASAI – 0 Reading:	29.67" Hg
Aneroid Barometer Reading:	29.71" Hg
Difference:	0.04" Hg
Barometer Adjusted?	Yes

Certified by: Patrick Selakovich 05/22/06 Calibrator (Signature/Date)

Bill Hefley 05/22/06 QA Officer (Signature/Date)

AIR SAMPLING ASSOCIATES, INC.

Post-Test Calibration Data

METHOD 5 DRY GAS METER CALIBRATION USING CRITICAL ORIFICES

ENVIRONMENTAL SUPPLY COMPANY

1) Select three critical orifices to calibrate the dry gas meter which bracket the expected operating range.
2) Record barometric pressure before and after calibration procedure.
3) Run at tested vacuum (from Orifice Calibration Report), for a period of time necessary to achieve a minimum total volume of 5 cubic feet.
4) Record data and information in the GREEN cells, YELLOW cells are calculated.

ASAI 1-1 06-15-2006

DATE: 06/15/06 | METER SERIAL #: 1508 | BAROMETRIC PRESSURE (in Hg): INITIAL 29.61, FINAL 29.58, AVG (P_{bar}) 29.595

METER PART #: C-5000-SO | CRITICAL ORIFICE SET SERIAL #: 1426S

IF Y VARIATION EXCEEDS 2.00%, ORIFICE SHOULD BE RECALIBRATED

ORIFICE #	RUN #	K' FACTOR (AVG)	TESTED VACUUM (In Hg)	DGM READINGS (FT³) INITIAL	DGM READINGS (FT³) FINAL	DGM READINGS (FT³) NET (V_m)	TEMPERATURES °F AMBIENT	DGM INLET INITIAL	DGM INLET FINAL	DGM OUTLET INITIAL	DGM OUTLET FINAL	DGM AVG	ELAPSED TIME (MIN) θ	DGM ΔH ($In H_2O$)	(1) V_m (STD)	(2) V_{cr} (STD)	(3) Y	Y VARIATION (%)	$\Delta H_@$
24	1	0.6583	15	767.635	772.855	5.220	95	96	96	95	95	95.5	6.00	2.35	4.9371	4.9633	1.005		1.83
	2	0.6583	15	772.855	778.140	5.285	95	96	97	95	95	95.75	6.00	2.35	4.9964	4.9633	0.993		1.83
	3	0.6583	15	778.140	783.420	5.280	95	97	97	95	95	96	6.00	2.35	4.9894	4.9633	0.995		1.83
																AVG =	0.998	0.47	
31	1	0.8447	15.5	800.712	806.350	5.638	96	96	97	95	96	96	5.00	3.95	5.3487	5.3024	0.991		1.87
	2	0.8447	15.5	806.350	812.030	5.680	96	97	98	96	96	96.75	5.00	3.95	5.3813	5.3024	0.985		1.87
	3	0.8447	15.5	812.030	817.695	5.665	96	98	99	96	96	97.25	5.00	3.95	5.3623	5.3024	0.989		1.87
																AVG =	0.989	-0.47	
	1					.0						0							
	2					.0						0							
	3					.0						0							
																AVG =			

USING THE CRITICAL ORIFICES AS CALIBRATION STANDARDS:

The following equations are used to calculate the standard volumes of air passed through the DGM, V_m (std), and the critical orifice, V_{cr} (std), and the DGM calibration factor, Y. These equations are automatically calculated in the spreadsheet above.

AVERAGE DRY GAS METER CALIBRATION FACTOR, Y = 0.993

AVERAGE $\Delta H_@$ = 1.85

(1) $$Vm_{(std)} = K_1 * Vm * \frac{Pbar + (\Delta H / 13.6)}{Tm}$$

= Net volume of gas sample passed through DGM, corrected to standard conditions

K_1 = 17.64 °R/in. Hg (English), 0.3858 °K/mm Hg (Metric)

T_m = Absolute DGM avg. temperature (°R - English, °K - Metric)

(2) $$Vcr_{(std)} = K' * \frac{Pbar * \Theta}{\sqrt{Tamb}}$$

= Volume of gas sample passed through the critical orifice, corrected to standard conditions

T_{amb} = Absolute ambient temperature (°R - English, °K - Metric)

K' = Average K' factor from Critical Orifice Calibration

(3) $$Y = \frac{Vcr_{(std)}}{Vm_{(std)}}$$

= DGM calibration factor

$$\Delta H_@ = \left(\frac{0.75\,\theta}{V_{cr(std)}}\right)^2 \Delta H \left(\frac{V_{m(std)}}{V_m}\right)$$

AIR SAMPLING ASSOCIATES, INC.

CALIBRATION DATA
PITOT TUBE CALIBRATION DATA

Date: 06/15/06 Time: 12:55
I.D. #: ASAI 1-4 T_s: 90 °F
C_{pstd}: 0.990 Pb: 29.64 " Hg

fps Mark	Desired Calibration Standard	Calibration Standard Start	Calibration Standard End	√ Standard Average	High	√ High	Cal. Factor	Low	√ Low	Cal. Factor
20	0.09	0.09	0.09	0.300	0.13	0.361	0.824	0.13	0.361	0.824
30	0.20	0.20	0.20	0.447	0.29	0.539	0.822	0.29	0.539	0.822
40	0.35	0.35	0.35	0.592	0.51	0.714	0.820	0.51	0.714	0.820
50	0.54	0.54	0.54	0.735	0.78	0.883	0.824	0.78	0.883	0.824
60	0.78	0.78	0.78	0.883	1.15	1.072	0.815	1.15	1.072	0.815
70	1.07	1.10	1.10	1.049	1.55	1.245	0.834	1.55	1.245	0.834
80	1.39	1.40	1.40	1.183	2.05	1.432	0.818	2.00	1.414	0.828
90	1.76	1.75	1.75	1.323	2.50	1.581	0.828	2.50	1.581	0.828
50	0.54	0.54	0.54	0.735	0.78	0.883	0.824	0.78	0.883	0.824
50	0.54	0.54	0.54	0.735	0.78	0.883	0.824	0.78	0.883	0.824
Average							0.823			0.824

Summary of Results:

Normal high side calibraiton factor:	0.823
variation +:	1.34%
variation -:	-0.97%
Normal low side calibration factor:	0.824
variation +:	1.21%
variation -:	-1.09%

Certification:
I certify that the Type S pitot tube, the standard type pitot tube, and the calibration setup meet or exceed all specifications, criteria and/or applicable design features and hereby assign a pitot tube calibration factor C_p of: 0.823

Certified by: *Scot Jackson 6/15/06* — Calibrator (Signature/Date)
Bill Hefley 6/15/06 — QA Officer (Signature/Date)

AIR SAMPLING ASSOCIATES, INC.

Calibration Data
Nozzle Calibration

Nozzle Set No. ASAI 1-
Date Calibration Performed: 06/15/06

	-1	-2	-3	-4	-5	-6	-7	-8
Measurement 1			0.238					
Measurement 2			0.238					
Measurement 3			0.241					
Measurement 4			0.240					
Measurement 5			0.240					
Measurement 6			0.241					
Measurement 7			0.240					
Measurement 8			0.240					
Measurement 9			0.240					
Measurement 10			0.238					
Average			0.240					

Scot Jackson 06/15/06
Calibrator (Signature / Date)

Bill Hefley 06/15/06
QA Officer (Signature / Date)

AIR SAMPLING ASSOCIATES, INC.

Calibration Data

Barometer Calibration Data

Date:	06/23/2006	Time:	13:20
I.D. #:	ASAI – 1	Temperature:	90

Mercury Barometer ASAI – 0 Reading:	29.78" Hg
Aneroid Barometer Reading:	29.78" Hg
Difference:	0.00" Hg
Barometer Adjusted?	NO

Certified by: *Patrick Selakovich 06/23/06*
Calibrator (Signature/Date)

Bill Hefley 06/23/06
QA Officer (Signature/Date)

AIR SAMPLING ASSOCIATES, INC.

Appendix D:

Field Data

Job Number 06-032 ✓
Job Name OG+E Electric Services ✓
Run Number 1 ✓
Unit Unit No. 6 Stack ✓
Date 14 June 2006 ✓
Operator Mullins, Jackson ✓
Sample Box No. 1-1 Meter Box No. 1-1

Particulate Field Data

Read and record at the start of each test point.

Purge to: —
Purge time: 1005 — 1105
Pilot Leak Check Initial ✓ Final ✓

Ambient Temp. °F 68
Assumed Moisture % 11.2
Probe Length 12'
C Factor 20.5 to reference
Initial Leak @ 15.0 "Hg = 0.002 cfm
Final Leak @ 5.5 "Hg = 0.000 cfm

Point	Clock Time	Dry Gas Meter, CF	"Pitot" "H2O ΔP_s	Orifice ΔH "H2O Desired	Orifice ΔH "H2O Actual	Pump Vacuum "Hg Guage P_m	Stack Temp °F T_s	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp. °F Inlet T_m	Dry Gas Temp. °F Outlet T_m	Remarks
D-3	0809	552.600	1.70	3.25	3.25	3.5	286	313	290	49	73	72	
2	0814	557.21	1.70	3.25	3.25	4.0	285	294	291	41	76	73	
1	0819	561.84	1.40	2.85	2.85	3.5	284	290	292	41	80	74	
End	0824	566.213	—	—	—	—	—	—	—	—	—	—	
C-3	0831	566.213	1.65	3.20	3.20	4.0	287	299	296	46	82	76	
2	0836	570.79	1.50	3.05	3.05	4.0	287	288	299	45	86	79	Filter Exit stayed at 265-280°F
1	0841	575.36	1.20	2.25	2.25	3.0	285	288	300	46	87	79	
End	0846	579.468	—	—	—	—	—	—	—	—	—	—	
B-3	0851	579.468	1.55	3.10	3.10	4.0	291	289	301	51	85	81	
2	0856	583.90	1.50	3.05	3.05	4.5	290	276	293	47	86	81	
1	0901	588.47	1.30	2.65	2.65	3.5	287	273	291	48	88	82	
End	0906	592.852	—	—	—	—	—	—	—	—	—	—	
A-3	0913	592.852	1.70	3.25	3.25	4.5	292	314	297	54	86	82	
2	0918	597.50	1.70	3.25	3.25	4.5	291	306	296	48	88	83	
1	0923	602.11	1.40	2.85	2.85	4.0	289	310	296	51	89	83	
End	0928	606.650	—	—	—	—	—	—	—	—	—	—	
AH													

Pitot Tube Calibration Factor C_p 0.821
Volume Collected V_m 53.618 ft³
Water Collected V_w 155.5 ml
Time of Test T_t 60 min.
Stack Pressure P_s -0.72 "H_2O

Pitot Tube No. 1-4
Baro. Press. P_b 29.49 "Hg
Probe Tip Dia. D_n 0.239 in.
% CO_2 12.4 % CO 0.0
% O_2 7.3 % N_2 80.3
Area Stack A 17.458 ft²

Barometer No. 1 Probe Tip No. 1-3
Total Volume of Leak Checks After Start: 0 ft³
V_m X Dry Gas Meter Calibration Factor 54.050 X 0.992 ✓

[Dry Gas Meter Reading ____ ft³ - (T_t ____ min. X Leak Rate ____ cfm)]

D-2

Impinger Box No. 1-1

			Water Weight Gain		
Impinger 1	Final Weight	835.7		Impinger 1	99.1
	Initial Weight	736.6			
	Increase	99.1		Impinger 2	29.1
Impinger 2	Final Weight	773.8		Impinger 3	4.2
	Initial Weight	744.7			
	Increase	29.1		Impinger 4	3.1
			V_w =		
Impinger 3	Final Weight	738.4	g SO_2 =	Impinger 5	20.0
	Initial Weight	734.2	V_w =		
	Increase	4.2		Impinger 6	
Impinger 4	Final Weight	837.2	Filter No A062	Impinger 7	
	Initial Weight	834.1			
	Increase	3.1		Total	155.5 = V_w
Impinger 5	Final Weight	960.9	P_b = 29.49 ✓	$\%CO_2$ = 12.4 ✓	
	Initial Weight	940.9	V_m = 53.618 ✓	$\%O_2$ = 7.3 ✓	
	Increase	20.0	V_w = 155.5 ✓	%CO = 0.0 ✓	
			P_m = 3.000 ✓	$\%N_2$ = 80.3 ✓	
Impinger 6	Final Weight		Avg ΔP = 1.525 ✓	A_s = 62,458 ✓	
	Initial Weight			D_n = 0.239 ✓	
	Increase		Avg $\sqrt{\Delta P}$ = 1.233 ✓	T_s = 60 ✓	
			C_p = 0.821 ✓		
Impinger 7	Final Weight		P_s = -0.72 ✓ "H_2O	29.44 ✓ "Hg	
	Initial Weight		T_m = 81 ✓ °F	541 ✓ °R	
	Increase		T_s = 288 ✓ °F	748 ✓ °R	

Moisture Content: %M = 12.37 ✓ M_d = 0.8763 ✓ MW_d = 30.276 ✓ MW = 28.76 ✓

$$Vm_{std} = 17.65\ Vm \left[\frac{P_b + \frac{P_m}{13.6}}{T_m + 460}\right] = 17.65 \times 53.618 \left[\frac{29.49 + \frac{3.000}{13.6}}{81 + 460}\right] = \frac{51.972}{0.86} \begin{matrix} \checkmark \\ \checkmark \end{matrix} \begin{matrix} scf \\ scm \end{matrix}$$

$Vw_{std} = 0.0472 \times Vw = 0.0472 \times 155.5 = 7.340$ ✓ scf

% Moisture = $\frac{Vw_{std}}{Vm_{std} + Vw_{std}} \times 100 = \frac{7.340}{51.972 + 7.340} \times 100 = 12.37$ ✓ %

$V_s = 5123.8 \times 0.821 \sqrt{\frac{748}{29.44 \times 28.76}} \times 1.233 = 4875$ ✓ fpm

ACFM: 2,114,518 ✓

SCFM: 1291,685 ✓

$\%I = \frac{1.039 \times 51.972 \times 748}{0.8763 \times 29.44 \times 4875 \times 60 \times (0.239)^2} = 93.7$ ✓ %

%EA: 52.2 ✓

Job Number 06-032 ✓
Job Name OG+E Electric Services ✓
Run Number 2
Unit Unit No. 6 Stack ✓
Date 14 June 2006 ✓
Operator Mullins, Jackson ✓
Sample Box No. 1-2 Meter Box No. 1-1

Particulate Field Data

Read and record at the start of each test point.

Purge to: —
Purge time: 1228-1328
Pilot Leak Check Initial ✓ Final ✓

Ambient Temp. °F 79
Assumed Moisture % 11.2
Probe Length 12' ✓ 6/14/06
C Factor 20.5 28.0 to reference
Initial Leak @ 15.0 "Hg = 0.002 cfm
Final Leak @ 8.0 "Hg = 0.000 cfm

Point	Clock Time	Dry Gas Meter, CF (V_m)	"Pitot" "H_2O" (ΔP_s)	Orifice ΔH "H_2O" Desired (P_m)	Orifice ΔH "H_2O" Actual (P_m)	Pump Vacuum "Hg Guage (P_m)	Stack Temp °F (T_s)	Probe Temp °F (T_s)	Oven Temp °F (T_s)	Effluent Temp °F (T_s)	Dry Gas Temp. °F Inlet (T_m)	Dry Gas Temp. °F Outlet (T_m)	Remarks
A-3	1046 ✓	607.434	1.70	3.90	3.90	7.5	298	326	296	56	85	85	
2	1051	612.36	1.60	3.70	3.70	7.0	299	319	295	51	86	85	
1	1056	617.35	1.45	3.30	3.30	5.5	293	316	305	54	87	85	
End	1101	622.101	—	—	—	—	—	—	—	—	—	—	
B-3	1106	622.101	1.50	3.45	3.45	6.5	297	326	308	61	86	85	
2	1111	626.86	1.40	3.20	3.20	5.5	295	317	297	55	87	85	
1	1116	631.55	1.25	2.85	2.85	5.0	293	314	291	47	89	86	
End	1121	636.003	—	—	—	—	—	—	—	—	—	—	
C-3	1125	636.003	1.45	3.30	3.30	6.0	296	324	305	53	88	86	
2	1130	640.70	1.40	3.20	3.20	6.0	294	319	305	47	89	87	
1	1135	645.31	1.20	2.75	2.75	5.0	291	323	310	49	90	87	
End	1140	649.701	—	—	—	—	—	—	—	—	—	—	
D-3	1143	649.701	1.65	3.80	3.80	8.0	296	329	312	54	90	87	
2	1148	654.63	1.65	3.80	3.80	8.0	295	326	308	52	91	88	
1	1153	659.64	1.40	3.20	3.20	6.5	291	327	300	54	92	88	
End	1158 ✓	664.482	—	—	—	—	—	—	—	—	—	—	
All													

Pitot Tube Calibration Factor C_p 0.821
Volume Collected V_m 56.592 ft³
Water Collected V_w 167.6 ml
Time of Test T_t 60 min.
Stack Pressure P_s -0.64 "H_2O

Pitot Tube No. 1-4
Baro. Press. P_b 29.58 "Hg
Probe Tip Dia. D_n 0.239 in.
% CO_2 12.0 % CO 0.0
% O_2 7.4 % N_2 80.6

Barometer No. 1
Probe Tip No. 1-3
Total Volume of Leak Checks After Start: 0 ft³
V_m X Dry Gas Meter Calibration Factor 57.048 X 0.992 ✓

[Dry Gas Meter Reading ____ ft³ - (T_t ____ min. X Leak Rate ____ cfm)]

Impinger Box No. 1-2

			Water Weight Gain	
Impinger 1	Final Weight	834.2	Impinger 1	103.0
	Initial Weight	731.2	Impinger 2	34.8
	Increase	103.0	Impinger 3	5.7
Impinger 2	Final Weight	768.8	Impinger 4	3.0
	Initial Weight	734.0	Impinger 5	21.1
	Increase	34.8	Impinger 6	
Impinger 3	Final Weight	736.0	Impinger 7	
	Initial Weight	730.3		
	Increase	5.7	Total	167.6 = V_w
Impinger 4	Final Weight	837.6		
	Initial Weight	834.6		
	Increase	3.0		
Impinger 5	Final Weight	972.0		
	Initial Weight	950.9		
	Increase	21.1		
Impinger 6	Final Weight			
	Initial Weight			
	Increase			
Impinger 7	Final Weight			
	Initial Weight			
	Increase			

V_w =
g SO_2 = ____
V_w =

Filter No. A063

P_b =	29.58		%CO_2 =	12.0
V_m =	56.592		%O_2 =	7.4
V_w =	167.6		%CO =	0.0
P_m =	3.371		%N_2 =	80.6
Avg ΔP =	1.471		A_n =	62.458
			D_n =	0.239
Avg$\sqrt{\Delta P}$ =	1.211		T_t =	60
C_p =	0.821			
P_s =	-0.64	"H_2O	29.53	"Hg
T_m =	87	°F	547	°R
T_s =	295	°F	755	°R

Moisture Content: %M = 12.68 M_d = 0.8732 MW_d = 30.216 MW = 28.67

$$Vm_{std} = 17.65\ Vm \left[\frac{P_b + \frac{P_m}{13.6}}{T_m + 460}\right] = 17.65 \times 56.592 \left[\frac{29.58 + \frac{3.371}{13.6}}{87 + 460}\right] = \frac{54.467\ \text{sft}^3}{0.908\ \text{scm}}$$

Vw_{std} = 0.0472 x Vw = 0.0472 x 167.6 = 7.911 sft^3

% Moisture = $\frac{Vw_{std}}{Vm_{std} + Vw_{std}}$ x 100 = $\frac{7.911}{54.467 + 56.592 + 7.911}$ x 100 = 12.68 %

V_s = 5123.8 x 0.821 $\sqrt{\frac{755}{29.53 \times 28.67}}$ x 1.211 = 4811 fpm

ACFM: 2,086,570

SCFM: 1,262,289

$$\%I = \frac{1.039 \times 54.467 \times 755}{0.8732 \times 29.53 \times 4811 \times 60 \times (0.239)^2} = 100.5\ \%$$

%EA: 53.0

Job Number 06-032 ✓
Job Name OG+E Electric Services ✓
Run Number 3 ✓
Unit Unit No. 6 Stack ✓
Date 14 June 2006 ✓
Operator Mullins, Jackson ✓
Sample Box No. 1-3 Meter Box No. 1-1

Particulates Field Data

Read and record at the start of each test point.

Purge to: —
Purge time: 1550-1650
Pilot Leak Check Initial ✓ Final ✓

Ambient Temp. °F 84
Assumed Moisture % 11.2
Probe Length 12.5" from 6/24/06
C Factor 20.5 23.2 to reference
Initial Leak @ 15.0 "Hg = 0.005 cfm
Final Leak @ 11.0 "Hg = 0.001 cfm

Point	Clock Time	Dry Gas Meter, CF	"Pitot" "H2O	Orifice ΔH "H2O Desired	Orifice ΔH "H2O Actual	Pump Vacuum "Hg Guage	Stack Temp °F	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp. °F Inlet	Dry Gas Temp. °F Outlet	Remarks
D-3	1358	667.941	1.70	3.90	10.5 3.90	10.5	317	316	322	59	89	90	
2	1403	672.97	1.70	3.90	3.90	10.5	313	312	310	47	90	90	
1	1408	678.04	1.40	3.20	3.20	10.0	303	313	326	49	92	90	
End	1413	682.668	—	—	—	—	—	—	—	—	—	—	
C-3	1417	682.668	1.60	3.70	3.70	9.0	319	314	325	51	93	91	
2	1422	687.53	1.50	3.45	3.45	8.0	313	312	321	47	93	91	
1	1427	692.38	1.25	2.85	2.85	7.0	305	313	330	49	94	91	
End	1432	697.079	—	—	—	—	—	—	—	—	—	—	
B-3	1437	697.079	1.55	3.50	3.50	8.0	318	322	331	56	91	91	
2	1442	701.95	1.50	3.45	3.45	8.0	314	318	322	52	93	92	
1	1447	706.75	1.20	2.75	2.75	6.5	305	318	327	55	94	91	
End	1452	711.100	—	—	—	—	—	—	—	—	—	—	
A-3	1456	711.100	1.70	3.90	3.90	10.0	314	318	319	57	94	92	
2	1501	716.10	1.70	3.90	3.90	10.0	318	318	314	55	94	92	
1	1506	721.21	1.50	3.45	3.45	7.5	307	318	317	58	94	91	
End	1511	726.078	—	—	—	—	—	—	—	—	—	—	
All													

Pilot Tube Calibration Factor C_p 0.821
Volume Collected V_m 57.672 ft³
Water Collected V_w 166.3 ml
Time of Test T_t 60 min.
Stack Pressure P_s -0.63 "H_2O

Pilot Tube No. 1-4
Baro. Press. P_b 29.48 "Hg
Probe Tip Dia. D_n 0.239 in.
% CO_2 12.5 % CO 0.0
% O_2 7.0 % N_2 80.5

Barometer No. 1 Probe Tip No. 1-3
Total Volume of Leak Checks After Start: 0 ft³
V_m X Dry Gas Meter Calibration Factor 58.137 X 0.992 ✓

[Dry Gas Meter Reading ___ ft³ - (T_t ___ min. X Leak Rate ___ cfm)]

D-6

Impinger Box No. 1-3

			Water Weight Gain	
Impinger 1	Final Weight	839.5		Impinger 1 107.1
	Initial Weight	732.4		
	Increase	107.1		Impinger 2 26.8
Impinger 2	Final Weight	783.0		Impinger 3 3.5
	Initial Weight	756.2		
	Increase	26.8		Impinger 4 2.9
			V_w =	
Impinger 3	Final Weight	756.6	g SO_2 =	Impinger 5 26.0
	Initial Weight	753.1	V_w =	
	Increase	3.5		Impinger 6 ____
Impinger 4	Final Weight	834.5		Impinger 7 ____
	Initial Weight	831.6		
	Increase	2.9	Filter No. A064	Total 166.3 = V_w
Impinger 5	Final Weight	999.3	P_b = 29.48	$\%CO_2$ = 12.5
	Initial Weight	973.3	V_m = 57.672	$\%O_2$ = 7.0
	Increase	26.0	V_w = 166.3	%CO = 0.0
			P_m = 3.496	$\%N_2$ = 80.5
Impinger 6	Final Weight	____	Avg ΔP = 1.525	A_s = 62,458
	Initial Weight	____		D_n = 0.239
	Increase		Avg$\sqrt{\Delta P}$ = 1.233	T_t = 60
			C_p = 0.821	
Impinger 7	Final Weight	____	P_s = -0.63 "H_2O	29.43 "Hg
	Initial Weight	____	T_m = 92 °F	552 °R
	Increase	____	T_s = 312 °F	772 °R

Moisture Content: %M = 12.52 M_d = 0.8748 MW_d = 30.280 MW = 28.74

$$Vm_{std} = 17.65\ Vm\left[\frac{P_b + \frac{P_m}{13.6}}{T_m + 460}\right] = 17.65 \times 57.672\left[\frac{29.48 + \frac{3.496}{13.6}}{92 + 460}\right] = \frac{54.836}{0.914}\ \frac{sft^3}{scfm}$$

$Vw_{std} = 0.0472 \times Vw = 0.0472 \times 166.3 = 7.849\ sft^3$

$$\%\ Moisture = \frac{Vw_{std}}{Vm_{std} + Vw_{std}} \times 100 = \frac{7.849}{54.836 + 7.849} \times 100 = 12.52\ \%$$

$$V_s = 5123.8 \times 0.821\sqrt{\frac{772}{28.74 \times 29.43}} \times 1.233 = 4955\ fpm$$

ACFM: 2,149,285

SCFM: 1,269,459

$$\%I = \frac{1.039 \times 54.836 \times 772}{0.8748 \times 29.43 \times 4955 \times 60 \times (0.239)^2} = 100.6\ \%$$

%EA: 48.8

ORSAT ANALYSIS DATA FORM

Job #: 06-032
Job Name: OG+E Electric Services
Location: Muskogee, OK
Date: 6/14/06
Operator: Mullins

Sample Location: Unit No. 6 Stack
Analytical Method: 3
Sample Type: Single Point / (Multi Point) Grab (Integrated)
Leak Check: Time: 12 hrs (≥ 4 minutes) Rate: 0.0
Ambient Air Check:

CO_2 - % Vol.	0.0
O_2 - % Vol.	20.9
N_2 - % Vol.	79.1

Run #: 1
Run Time: 0809 – 0928

CO_2 - % Vol.	12.4	12.4	12.4	12.4
O_2 - % Vol.	7.3	7.3	7.3	7.3
CO - % Vol.	0.0	0.0	0.0	0.0
N_2 - % Vol.	80.3	80.3	80.3	80.3

Run #: 2
Run Time: 1046-1158

	Analysis #1	Analysis #2	Analysis #3	Average - % Volume
CO_2 - % Vol.	12.0	12.0	12.0	12.0
O_2 - % Vol.	7.4	7.4	7.3	7.4
CO - % Vol.	0.0	0.0	0.0	0.0
N_2 - % Vol.	80.6	80.6	80.7	80.6

Run #: 3
Run Time: 1358-1511

	Analysis #1	Analysis #2	Analysis #3	Average - % Volume
CO_2 - % Vol.	12.5	12.6	12.5	12.5
O_2 - % Vol.	7.0	6.9	7.0	7.0
CO - % Vol.	0.0	0.0	0.0	0.0
N_2 - % Vol.	80.5	80.5	80.5	80.5

PRELIMINARY VELOCITY TRAVERSE DATA
AND
SAMPLING LOCATION DATA

Job Number 06-010
Job Name OG&E
Sampling Location Unit No. 6
Date 2/27/06 Time 2/27/06

Stack Height _____ ft.
Sampling Port Height Above Ground _____ ft.

	Port A	Port B	Port C	Port D	Average
Port & Inside Diameter (in.)	282"	282"	282"	282"	
Port & Wall Thickness (in.)	15"	15"	15"	15"	15"
Inside Stack Diameter (in.)	282"	282"	282"	282"	282"

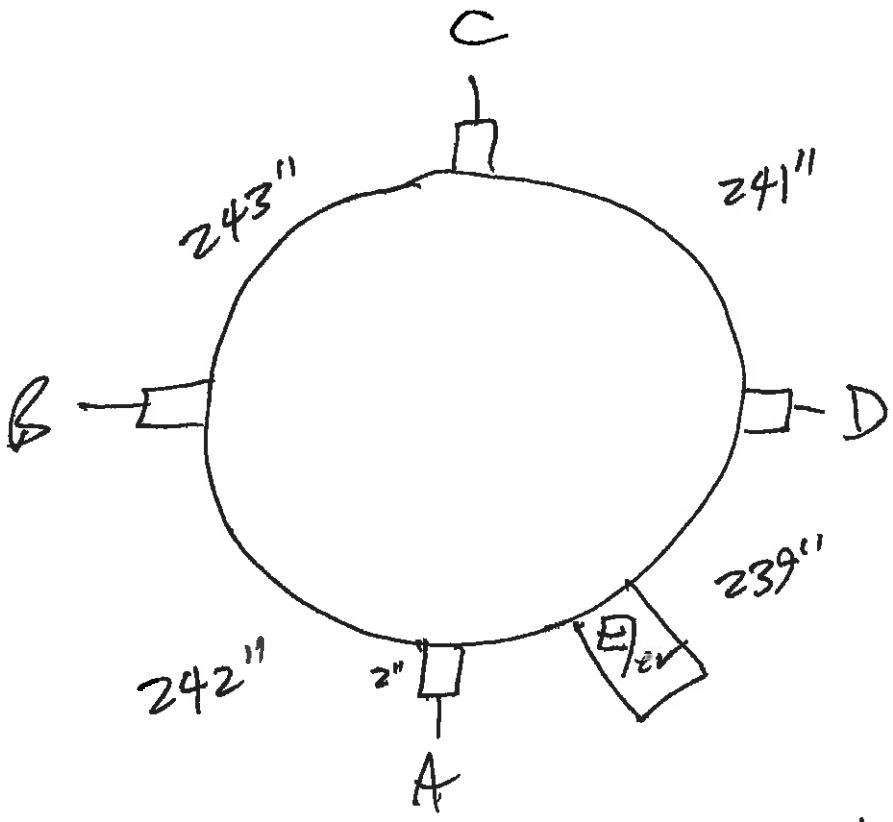
Sampling Ports are 216 ft. _____ in. (_____ stack diameters) downstream from disturbance (inlet, constriction, bend, expansion)

Sampling Ports are 240 ft. _____ in. (10.21 stack diameters) upstream from disturbance (outlet, constriction, bend, expansion)

Point Number	Percent Diameter	Distance from Ref. Point (decimal in.)	Distance from Ref. Point (fractional in.)	Port A $\Delta P/T_s/\alpha$	Port B $\Delta P/T_s/\alpha$	Port C $\Delta P/T_s/\alpha$	Port D $\Delta P/T_s/\alpha$
1	4.4	12.408	12 7/16"	/ /	/ /	1.301 272	/ /
2	14.6	41.172	41 3/16"	/ /	/ /	1.401 272	/ /
3	29.6	83.472	83 1/2"	/ /	/ /	1.501 272	/ /
4	70.4	198.528	198 1/2"	/ /	/ /	/ /	/ /
5	85.4	240.828	240 13/16"	/ /	/ /	/ /	/ /
6	95.6	269.592	269 9/16"	/ /	/ /	/ /	/ /
7				/ /	/ /	/ /	/ /
8				/ /	/ /	/ /	/ /
9				/ /	/ /	/ /	/ /
10				/ /	/ /	/ /	/ /
11				/ /	/ /	/ /	/ /
12				/ /	/ /	/ /	/ /
13				/ /	/ /	/ /	/ /
14				/ /	/ /	/ /	/ /
15				/ /	/ /	/ /	/ /
16				/ /	/ /	/ /	/ /
17				/ /	/ /	/ /	/ /
18				/ /	/ /	/ /	/ /
19				/ /	/ /	/ /	/ /
20				/ /	/ /	/ /	/ /
21				/ /	/ /	/ /	/ /
22				/ /	/ /	/ /	/ /
23				/ /	/ /	/ /	/ /
24				/ /	/ /	/ /	/ /

Pitot Tube No. 1-4
C_p = 0.824
P_b = 29.29 "Hg
P_s = ~~38~~ 0 "H_2O 29.29 "Hg
A_s = 62,458 in.²

Average ΔP 1.333
Average $\Delta P^{1/2}$ 1.152
Average T_s 272 °F
Average α — degrees



500' > 240'
Joints 260

OC = 965"

OD = 307.169

2W = -26

281 3/16"

23'-6"

ID = 282"

AIR SAMPLING ASSOCIATES, INC.

Appendix E:

Analytical Data

AIR SAMPLING ASSOCIATES, INC.

Air Sampling Associates, Inc.

Particulate Analysis Summary

Project Number: 06-032 **Date Analysis Completed:** 6/15/06

Project Name: OG+E Electric Services **Unit Tested:** Unit No. 6 Stack

Project Location: Muskogee, OK

Run Number:	1	2	3
Particulate Matter on Filter (mg):	9.8	9.5	11.7
Particulate Matter in Front Wash (mg):	5.7	4.4	3.2
Total Particulate Matter in "Front-Half" – MF (mg):	15.5	13.9	14.9
Particulate Matter in "Back-Half" (mg): (BH)	17.0 ~~18.8~~	15.6	17.3
Total Particulate Matter in Sample – MT (mg):	32.5	29.5	32.2

Billy J. Mullens, J
Analyst

Date: 6/28/06

Data Checked By (Front Half only)

Version No. 1 5/30/06

AIR SAMPLING ASSOCIATES, INC.

Particulate Analysis EPA Method 5

Stack Filters

Project No. 06-032 Location Muskogee, OK
Project Name OG+E Electric Services Unit Tested Unit No. 6 Stack

Desiccator Time In	0800 6/15/06	0900 6/16/06			
Desiccator Time Out	0855 6/16/06	1545 6/16/06			

Run No.	1	Filter No.	A062	Sample I.D.	
Filter & Particulate (g)	0.3764	0.3764 ✓			

Filter & Particulate Average (g) 0.3764
Initial Filter Weight (g) 0.3666
Total Particulate (mg) 9.8

Run No.	2	Filter No.	A063	Sample I.D.	
Filter & Particulate (g)	0.3739	0.3737 ✓			

Filter & Particulate Average (g) 0.3737
Initial Filter Weight (g) 0.3642
Total Particulate (mg) 9.5

Run No.	3	Filter No.	A064	Sample I.D.	
Filter & Particulate (g)	0.3771	0.3772 ✓			

Filter & Particulate Average (g) 0.3772
Initial Filter Weight (g) 0.3655
Total Particulate (mg) 11.7

Billy J. Mullins Jr.
Analyst

AIR SAMPLING ASSOCIATES, INC.

Filter Weight Log
EPA Method 5

Filter No.	Into Desicator Date / Time	Weight Date / Time	Weight Date / Time	Weight Date / Time	Weight Date / Time	Weight Date / Time	Weight Used
A Φ61	0800 6/1/06 0800	0.3618 6/7/06 0954	0.3618 6/13/06 0615				0.3618
AΦ62		0.3666 6/8/06 1031	0.3666 6/9/06 1051				0.3666
AΦ63		0.3641 6/8/06 1032	0.3642 6/9/06 1052				0.3642
AΦ64	6/6/06	0.3656 0.3655 1033	6/9/06 0.3655 1053				0.3655
AΦ65	6/6/06	0.3630 0.3630 1034	0.3630 6/9/06 1054				0.3630
AΦ66	6/6/06	0.3677 0.3675 1035	0.3675 6/9/06 1055				0.3675
AΦ67	6/6/06	0.3652 0.3652 1035	0.3652 6/9/06 1056				0.3652
AΦ68	6/6/06	0.3673 0.3671 1036	0.3671 6/9/06 1057				0.3671
AΦ69	6/6/06	0.3585 0.3585 1036	0.3586 6/9/06 1058				0.3586
AΦ70	A6/08/06 & 1037 6/8/06 1037						
AΦ71							
AΦ72							
AΦ73							

AIR SAMPLING ASSOCIATES, INC.

Page 1 of 1

Particulate Analysis EPA Method 5

Front Wash

Project No. 06-032 Location Muskogee, OK
Project Name OG+E Electric Services Unit Tested Unit No. 6 Stack

Desiccator Time In	0930 6/17/06	1025 6/18/06			
Desiccator Time Out	1020 6/17/06	1630 6/18/06			

Run No.	1	Volume (ml)	755	Sample I.D.	
Final Weight (g)	105.7735	105.7735 ✓			
Initial Weight (g)	105.7618	105.7618			
Particulate Weight (g)					

Particulate Average (mg) 11.7
Less Acetone Blank (mg) 6.0
Total Particulate (mg) 5.7

Run No.	2	Volume (ml)	395	Sample I.D.	
Final Weight (g)					
Initial Weight (g)	107.3052	107.3051 ✓			
Particulate Weight (g)	107.2976	107.2976			

Particulate Average (mg) 7.5
Less Acetone Blank (mg) 3.1
Total Particulate (mg) 4.4

Run No.	3	Volume (ml)	420	Sample I.D.	
Final Weight (g)	108.7964	108.7964 ✓			
Initial Weight (g)	108.7899	108.7899			
Particulate Weight (g)					

Particulate Average (mg) 6.5
Less Acetone Blank (mg) 3.3
Total Particulate (mg) 3.2

Acetone Blank		Volume (ml)	200	Sample I.D.	
Final Weight (g)	106.5444	106.5449 ✓			
Initial Weight (g)	106.5432	106.5432			
Particulate Weight (g)					

Average (mg) 1.7
* mg/l 8.5

* Note: if greater than 7.9 mg/l, use 7.9 mg/l

Billy J. Mullins, Jr. Date: 6/18/06
Analyst

Version No.1 5/30/06

AIR SAMPLING ASSOCIATES, INC.

Particulate Analysis EPA Method 5

Front Half Tare Weights

Project No. 06-032 Location Muskogee, OK
Project Name OG+E Electric Services Unit Tested Unit No. 6 Stack

Desiccator Time In	1000 6/13/06	0755 6/15/06			
Desiccator Time Out	0750 6/15/06	1415 6/15/06			

Run No. 1				Sample I.D.	
Weight (g)	105.7623	105.7613 ✓			

Run No. 2				Sample I.D.	
Weight (g)	107.2975	107.2976 ✓			

Run No. 3		Volume (ml)		Sample I.D.	
Weight (g)	108.7900	108.7899 ✓			

Acetone Blank		Volume (ml)		Sample I.D.	
Weight (g)	106.5432	106.5432 ✓			

Billy J. Mullins Jr
Analyst

DI Water Analysis (Back)

Job Number 06-4011C
Client Name Air Sampling Associates
Unit Name Unit No. 6 Stack

Run Date 6/14/2006
Method: 202

RUN 1	**BEAKER**	9213	**VOLUME**	ml	602	**AVERAGE**
Beaker + Particulate (g)		115.9267	115.9267			115.9267
Beaker Tare (g)		115.9018	115.9022			115.9020
Particulate Weight (g)		0.0249	0.0245			0.0247 Total

24.7 mg - 1.3 mg = 23.4 mg

RUN 2	**BEAKER**	9215	**VOLUME**	ml	595	**AVERAGE**
Beaker + Particulate (g)		96.3988	96.3990			96.3989
Beaker Tare (g)		96.3740	96.3741			96.3741
Particulate Weight (g)		0.0248	0.0249			0.0248

24.8 mg - 1.3 mg = 23.5 mg

RUN 3	**BEAKER**	9217	**VOLUME**	ml	626	**AVERAGE**
Beaker + Particulate (g)		106.8553	106.8554			106.8554
Beaker Tare (g)		106.8304	106.8307			106.8306
Particulate Weight (g)		0.0249	0.0247			0.0248

24.8 mg - 1.4 mg = 23.4 mg

Blank	**BEAKER**	9211	**VOLUME**	ml	588	**AVERAGE**
Beaker + Particulate (g)		104.1859	104.1858			104.1859
Beaker Tare (g)		104.1844	104.1848			104.1846
Particulate Weight (g)		0.0015	0.0010			0.0013

2.2 mg/l

Analyst LB

FINAL REPORT

Started 6/21/2006
Completed 7/5/2006

Methylene Chloride Rinse

Job Number 06-4011C **Run Date** 6/14/2006
Client Name Air Sampling Associates
Unit Name Unit No. 6 Stack Method: 202

RUN 1	**BEAKER**	9214	**VOLUME**	ml	229	**AVERAGE**
Beaker + Particulate (g)		117.3913	117.3912			117.3913
Beaker Tare (g)		117.3906	117.3910			117.3908
Particulate Weight (g)		0.0007	0.0002			0.0005

Total
0.5 mg - 0.6 mg = Ø mg

RUN 2	**BEAKER**	9216	**VOLUME**	ml	234	**AVERAGE**
Beaker + Particulate (g)		122.0844	122.0849			122.0847
Beaker Tare (g)		122.0839	122.0844			122.0842
Particulate Weight (g)		0.0005	0.0005			0.0005

0.5 mg - 0.6 mg = Ø mg

RUN 3	**BEAKER**	9218	**VOLUME**	ml	238	**AVERAGE**
Beaker + Particulate (g)		95.9063	95.9068			95.9066
Beaker Tare (g)		95.9053	95.9053			95.9053
Particulate Weight (g)		0.0010	0.0015			0.0013

1.3 mg - 0.6 mg = 0.7 mg

Blank	**BEAKER**	9212	**VOLUME**	ml	233	**AVERAGE**
Beaker + Particulate (g)		113.1035	113.1036			113.1036
Beaker Tare (g)		113.1029	113.1031			113.1030
Particulate Weight (g)		0.0006	0.0005			0.0006

2.6 mg/l

Analyst LB

FINAL REPORT

Started 6/21/2006
Completed 7/5/2006

Sulfate

	Lab Results, ug	Blank, ug	Final Results, mg
Unit 6 Stack			
Run 1	18256	36.6	6.450
Run 2	22403	36.6	7.918
Run 3	19287	36.6	6.815
Blank	135		

		Lab Results, ug	Blank, ug	Final Results, mg Corrected to NH4Cl
Chloride				
Unit 6 Stack				
	Run 1	5.15	58	-0.080
	Run 2	6.4	58	-0.078
	Run 3	22.6	58	-0.053
	Blank	58		

AIR SAMPLING ASSOCIATES, INC.

Appendix F:

Chain of Custodies

CHAIN OF CUSTODY

Project #: 06-032 Date: 6/14/06

Client: OG+E Electric Services

Location: Muskogee, OK

Unit: Unit No. 6 Stack

	Number of Containers	Absorbing Solution	Analysis Required
Filter Container	1 1 1	—	Particulate
Front Wash	1 1 1	Acetone	Particulate
Back Wash			
Impinger #1			
Impinger #2			
Impinger #3			
Impinger #4			
Impinger #5			
Impinger #6			
Impinger #7			
Blank #1	1	Acetone	Particulate
Blank #2			
Other			

Special Instructions

Sample # 1 Recovered by Billy J. Mullins Jr Date 6/14/06 Time 1640 Location Trailer

Sample # 2 Recovered by Billy J. Mullins Jr Date 6/14/06 Time 1655 Location Trailer

Sample # 3 Recovered by Billy J. Mullins Jr Date 6/14/06 Time 1715 Location Trailer

Sample # Recovered by Date Time Location

Samples Received by Billy J. Mullins Jr for transport Date 6/14/06 Time 1800

Samples Released by Billy J. Mullins Jr Date 6/15/06 Time 0800

Samples Received by Billy J. Mullins Jr at lab Date 6/15/06 Time 0800

Samples Analyzed by Billy J. Mullins Jr Date 6/18/06 Time 1635

AIR SAMPLING ASSOCIATES, INC.

Chain of Custody Record

Client	Project No.	Page	of
OG+E Electric Services	06-032	1	
Address	Unit No.	Lab	
	Unit No. 6 Stack	Western Environmental	
City / State / Zip Code	Project Manager	Lab Contact	
Muskogee / OK	Bill Mullins	Lonnie Bull	
Run No.	Test Method	Lab Phone No.	
1, 2, 3	EPA Method 202		

Sample I.D.	Date	Time	Absorbing Solution	No. of Containers	Volume Blank / Comments / Gravimetric	EPA Method 202	Sulfates & chlorides	Analysis		
Run 1-DI Back Half	6/14/06	1645	DI Water	1	609 9213	✓	X	100ml		
Run 1-MeCl Rinse	6/14/06	1650	MeCl	1	229 9214	✓				
Run 2-DI Back Half	6/14/06	1705	DI Water	1	595 9215	✓	X	100ml		
Run 2-MeCl Rinse	6/14/06	1708	MeCl	1	234 9216	✓				
Run 3-DI Back Half	6/14/06	1730	DI Water	1	626 9217	✓	X	100ml		
Run 3-MeCl Rinse	6/14/06	1735	MeCl	1	238 9218	✓				
DI Water Blank	6/14/06	1735	DI Water	1	585 9211	✓	X	100ml		
MeCl Blank	6/14/06	1735	MeCl	1	233 9213	✓				

Special Instructions:

Turn Around Time Required: ☒ Normal ☐ Rush | Sample Disposal: ☐ Return to ASAI ☒ Disposal By Lab ☒ Archive For 6 Months

	Date	Time		Date	Time
1. Recovered By: Billy J. Mullins, J.	6/14/06	1750	1. Relinquished By: Billy J. Mullins, J.	6/15/06	0800
2. Received By:	6/15/06	0830	2. Relinquished By:	6/20/06	0800
3. Received By:	6/21/06	1300	3. Relinquished By: Chris Todd / Enthalpy	7/06/06	9:05

Comments: SHIP TO WESTERN VIA FED EX 6/20/06 Temp: Ambient

P.O. Box 1175 · Lewisville, TX 75067 · Office: (972) 492-1400 · Fax: (972) 492-1402 · Toll-Free: (866) 311-9940

AIR SAMPLING ASSOCIATES, INC.

Appendix G:

Unit Operational Data

Average Values Report
Generated: 6/14/2006 11:49

Company: Oklahoma Gas & Electric
Plant: Muskogee Generating Station
City/St: Fort Gibson, OK, 74434
Source: Unit 6

Period Start: 6/14/2006 07:09
Period End: 6/14/2006 08:28
Validation Type: 1/1 min
Averaging Period: 1 min
Type: Block Avg

Period Start:	Average 6_MW MW
06/14/2006 07:09	545.8
06/14/2006 07:10	544.4
06/14/2006 07:11	545.1
06/14/2006 07:12	545.9
06/14/2006 07:13	548.0
06/14/2006 07:14	548.1
06/14/2006 07:15	547.3
06/14/2006 07:16	546.8
06/14/2006 07:17	546.5
06/14/2006 07:18	546.1
06/14/2006 07:19	545.4
06/14/2006 07:20	544.9
06/14/2006 07:21	545.4
06/14/2006 07:22	543.9
06/14/2006 07:23	543.6
06/14/2006 07:24	542.6
06/14/2006 07:25	541.9
06/14/2006 07:26	541.9
06/14/2006 07:27	542.1
06/14/2006 07:28	542.1
06/14/2006 07:29	542.6
06/14/2006 07:30	542.4
06/14/2006 07:31	543.0
06/14/2006 07:32	543.3
06/14/2006 07:33	544.3
06/14/2006 07:34	544.2
06/14/2006 07:35	544.9
06/14/2006 07:36	545.4
06/14/2006 07:37	547.0
06/14/2006 07:38	549.0
06/14/2006 07:39	548.4
06/14/2006 07:40	549.4
06/14/2006 07:41	550.7
06/14/2006 07:42	550.9
06/14/2006 07:43	550.9
06/14/2006 07:44	551.3
06/14/2006 07:45	550.2
06/14/2006 07:46	549.6
06/14/2006 07:47	548.5
06/14/2006 07:48	548.9
06/14/2006 07:49	548.0
06/14/2006 07:50	546.5
06/14/2006 07:51	547.0
06/14/2006 07:52	547.8
06/14/2006 07:53	547.9
06/14/2006 07:54	548.6
06/14/2006 07:55	548.6
06/14/2006 07:56	549.5
06/14/2006 07:57	549.3
06/14/2006 07:58	549.2
06/14/2006 07:59	548.4
06/14/2006 08:00	548.8
06/14/2006 08:01	549.5
06/14/2006 08:02	550.0
06/14/2006 08:03	549.1
06/14/2006 08:04	546.8
06/14/2006 08:05	545.7
06/14/2006 08:06	545.1
06/14/2006 08:07	544.5
06/14/2006 08:08	544.3
06/14/2006 08:09	544.9
06/14/2006 08:10	544.9
06/14/2006 08:11	544.8

Average Values Report
Generated: 6/14/2006 11:49

Company: Oklahoma Gas & Electric
Plant: Muskogee Generating Station
City/St: Fort Gibson, OK, 74434
Source: Unit 6

Period Start: 6/14/2006 07:09
Period End: 6/14/2006 08:28
Validation Type: 1/1 min
Averaging Period: 1 min
Type: Block Avg

Period Start:	Average 6_MW MW
06/14/2006 08:12	546.0
06/14/2006 08:13	546.8
06/14/2006 08:14	549.4
06/14/2006 08:15	550.3
06/14/2006 08:16	550.7
06/14/2006 08:17	551.3
06/14/2006 08:18	550.0
06/14/2006 08:19	549.3
06/14/2006 08:20	548.1
06/14/2006 08:21	546.6
06/14/2006 08:22	545.5
06/14/2006 08:23	544.6
06/14/2006 08:24	544.4
06/14/2006 08:25	543.5
06/14/2006 08:26	543.2
06/14/2006 08:27	544.8
06/14/2006 08:28	546.0
Daily Average*	**546.7**
Maximum*	**551.3**
	06/14/2006 8:17
Minimum*	**541.9**
	06/14/2006 7:26

* Does not include Invalid Averaging Periods ("N/A")

Average Values Report
Generated: 6/14/2006 11:15

Company: Oklahoma Gas & Electric
Plant: Muskogee Generating Station
City/St: Fort Gibson, OK, 74434
Source: Unit 6

Period Start: 6/14/2006 09:46
Period End: 6/14/2006 10:58
Validation Type: 1/1 min
Averaging Period: 1 min
Type: Block Avg

Period Start:	Average 6_MW MW
06/14/2006 09:46	544.0
06/14/2006 09:47	542.3
06/14/2006 09:48	540.7
06/14/2006 09:49	536.7
06/14/2006 09:50	536.2
06/14/2006 09:51	534.9
06/14/2006 09:52	532.1
06/14/2006 09:53	530.1
06/14/2006 09:54	528.7
06/14/2006 09:55	527.0
06/14/2006 09:56	525.8
06/14/2006 09:57	524.8
06/14/2006 09:58	524.8
06/14/2006 09:59	523.0
06/14/2006 10:00	522.8
06/14/2006 10:01	522.9
06/14/2006 10:02	523.7
06/14/2006 10:03	526.4
06/14/2006 10:04	527.5
06/14/2006 10:05	528.9
06/14/2006 10:06	527.5
06/14/2006 10:07	526.4
06/14/2006 10:08	524.3
06/14/2006 10:09	524.5
06/14/2006 10:10	523.8
06/14/2006 10:11	524.4
06/14/2006 10:12	524.9
06/14/2006 10:13	524.8
06/14/2006 10:14	524.6
06/14/2006 10:15	524.8
06/14/2006 10:16	524.4
06/14/2006 10:17	524.8
06/14/2006 10:18	525.1
06/14/2006 10:19	526.3
06/14/2006 10:20	526.6
06/14/2006 10:21	527.9
06/14/2006 10:22	528.8
06/14/2006 10:23	528.3
06/14/2006 10:24	529.1
06/14/2006 10:25	528.3
06/14/2006 10:26	528.3
06/14/2006 10:27	527.7
06/14/2006 10:28	528.5
06/14/2006 10:29	528.8
06/14/2006 10:30	528.1
06/14/2006 10:31	527.6
06/14/2006 10:32	527.1
06/14/2006 10:33	525.8
06/14/2006 10:34	525.0
06/14/2006 10:35	524.7
06/14/2006 10:36	525.5
06/14/2006 10:37	525.8
06/14/2006 10:38	526.3
06/14/2006 10:39	527.1
06/14/2006 10:40	527.4
06/14/2006 10:41	527.9
06/14/2006 10:42	527.8
06/14/2006 10:43	527.7
06/14/2006 10:44	528.1
06/14/2006 10:45	528.7
06/14/2006 10:46	529.1
06/14/2006 10:47	528.9
06/14/2006 10:48	528.2

Average Values Report
Generated: 6/14/2006 11:15

Company: Oklahoma Gas & Electric
Plant: Muskogee Generating Station
City/St: Fort Gibson, OK, 74434
Source: Unit 6

Period Start: 6/14/2006 09:46
Period End: 6/14/2006 10:58
Validation Type: 1/1 min
Averaging Period: 1 min
Type: Block Avg

Period Start:	Average 6_MW MW
06/14/2006 10:49	527.8
06/14/2006 10:50	528.3
06/14/2006 10:51	528.6
06/14/2006 10:52	528.6
06/14/2006 10:53	528.5
06/14/2006 10:54	528.0
06/14/2006 10:55	528.2
06/14/2006 10:56	529.1
06/14/2006 10:57	529.0
06/14/2006 10:58	528.6
Daily Average*	**527.9**
Maximum*	**544.0**
	06/14/2006 9:46
Minimum*	**522.8**
	06/14/2006 10:00

* Does not include Invalid Averaging Periods ("N/A")

Average Values Report
Generated: 6/14/2006 14:17

Company: Oklahoma Gas & Electric
Plant: Muskogee Generating Station
City/St: Fort Gibson, OK, 74434
Source: Unit 6

Period Start: 6/14/2006 12:58
Period End: 6/14/2006 14:11
Validation Type: 1/1 min
Averaging Period: 1 min
Type: Block Avg

Period Start:	Average 6_MW MW
06/14/2006 12:58	545.1
06/14/2006 12:59	545.0
06/14/2006 13:00	545.3
06/14/2006 13:01	546.0
06/14/2006 13:02	546.0
06/14/2006 13:03	546.1
06/14/2006 13:04	545.8
06/14/2006 13:05	545.0
06/14/2006 13:06	545.1
06/14/2006 13:07	544.8
06/14/2006 13:08	544.7
06/14/2006 13:09	544.7
06/14/2006 13:10	544.7
06/14/2006 13:11	544.3
06/14/2006 13:12	544.2
06/14/2006 13:13	543.8
06/14/2006 13:14	543.6
06/14/2006 13:15	544.1
06/14/2006 13:16	543.4
06/14/2006 13:17	543.2
06/14/2006 13:18	542.2
06/14/2006 13:19	541.8
06/14/2006 13:20	542.3
06/14/2006 13:21	543.4
06/14/2006 13:22	544.5
06/14/2006 13:23	545.3
06/14/2006 13:24	545.1
06/14/2006 13:25	545.2
06/14/2006 13:26	545.7
06/14/2006 13:27	547.0
06/14/2006 13:28	546.7
06/14/2006 13:29	546.3
06/14/2006 13:30	545.1
06/14/2006 13:31	544.9
06/14/2006 13:32	544.9
06/14/2006 13:33	545.6
06/14/2006 13:34	544.6
06/14/2006 13:35	544.2
06/14/2006 13:36	543.5
06/14/2006 13:37	543.2
06/14/2006 13:38	542.8
06/14/2006 13:39	541.0
06/14/2006 13:40	540.5
06/14/2006 13:41	540.8
06/14/2006 13:42	541.1
06/14/2006 13:43	541.3
06/14/2006 13:44	541.1
06/14/2006 13:45	542.1
06/14/2006 13:46	542.9
06/14/2006 13:47	543.3
06/14/2006 13:48	544.1
06/14/2006 13:49	544.5
06/14/2006 13:50	543.0
06/14/2006 13:51	541.1
06/14/2006 13:52	541.7
06/14/2006 13:53	546.9
06/14/2006 13:54	549.6
06/14/2006 13:55	549.9
06/14/2006 13:56	547.7
06/14/2006 13:57	544.1
06/14/2006 13:58	540.0
06/14/2006 13:59	536.6
06/14/2006 14:00	536.2

Average Values Report
Generated: 6/14/2006 14:17

Company: Oklahoma Gas & Electric
Plant: Muskogee Generating Station
City/St: Fort Gibson, OK, 74434
Source: Unit 6

Period Start: 6/14/2006 12:58
Period End: 6/14/2006 14:11
Validation Type: 1/1 min
Averaging Period: 1 min
Type: Block Avg

Period Start:	Average 6_MW MW
06/14/2006 14:01	536.7
06/14/2006 14:02	537.2
06/14/2006 14:03	538.3
06/14/2006 14:04	538.1
06/14/2006 14:05	538.2
06/14/2006 14:06	538.1
06/14/2006 14:07	539.0
06/14/2006 14:08	539.6
06/14/2006 14:09	540.4
06/14/2006 14:10	541.7
06/14/2006 14:11	543.0
Daily Average*	**543.2**
Maximum*	**549.9**
	06/14/2006 13:55
Minimum*	**536.2**
	06/14/2006 14:00

* Does not include Invalid Averaging Periods ("N/A")

AIR SAMPLING ASSOCIATES, INC.

Appendix H:

Resumes of Test Personnel

AIR SAMPLING ASSOCIATES, INC.

BILLY J. MULLINS, JR.; President

Education	Post Graduate Study Environmental Engineering at Southern Methodist University; Dallas, Texas 1970. M.S. 1969, New York University; New York, New York, in Civil Engineering (Air Resources). B.S. 1968, Texas Tech University; Lubbock, Texas, in Civil Engineering (Water Resources). Studies in Engineering at the U.S. Naval Academy; Annapolis, Maryland, 1963-1964
Professional Training Courses	Attended Short Course on Air Pollution Engineering at the University of Texas at Austin, February 1970. Attended four-week management course presented by the American Management Association, 1976.
Certification	Registered Professional Engineer Certified Visible Emissions Evaluator Licensed Private Pilot (Multi-Engine-Land, Instrument) Diplomat in the American Academy of Environmental Engineers Inductee into the Stack Sampling Hall of Fame Certified as Qualified Environmental Professional (QEP)
Professional Memberships	**Air & Waste Management Association** – Past Chairman, Past Vice Chairman, and Past Board of Directors of North Texas Chapter and Southwest Section; Past Chairman, Consultants Committee; Past Chairman, Source Measurement Committee **Source Evaluations Society** – Past President, Past Board of Directors **American Management Association**

AIR SAMPLING ASSOCIATES, INC.

MULLINS (p. 2)

Publications

Authored "Real World Experience with USEPA's New Sampling and Analytical Methods for Conducting Risk Burn," May 1998.

Co-authored "Sulfur Compound Emissions of the Petroleum Production Industry," December 1974.

Co-authored "Field Procedure for Stabilizing Hydrogen Sulfide Samples to be Analyzed Using Modified Methylene Blue Technique," presented at the Conference on Ambient Air Quality Measurements, Austin, Texas, March 1975.

Co-authored "Atmospheric Emissions Survey of the Sour Gas Industry," October 1975.

Co-authored "Technique for Insuring the Validity of Samples for High Concentrations of Sulfur Dioxide Using the EPA Method 5 Sampling Train," presented at the Third National Conference on Energy and the Environment, College Corner, Ohio, September 1975.

Teaching Experience

Conducted training seminars on sampling methods periodically since 1974 to present.

Conducted a one-day seminar on Part 75 Testing over ten times in 1993 and 1994.

Served as a lecturer in the Environmental Protection Agency's (EPA) training course number 450, "Source Sampling for Particulate Pollutants," for two years from January 1974 to October 1975 and March, 1992.

Conducted a two-day training course entitled "technical Assistance in Source Sampling" at Iowa State University, Ames, Iowa, for the Environmental Protection Agency (EPA), October 1974.

Conducted Environmental Protection Agency's (EPA) training course number 450, "Source Sampling for Particulate Pollutants," at Research Triangle Park, North Carolina, September 1975.

AIR SAMPLING ASSOCIATES, INC.

MULLINS (p. 3)

Teaching Experience (Cont'd)

Conducted a two-day short course entitled "Performing and Observing Source Sampling," Dallas, Texas, July 1976, May 1977, October 1977, November 1987 and November 1988; Lake Charles, Louisiana, May 1977; Casper Wyoming, May 1977; Point Comfort, Texas, November 1992.

Served as a lecturer in the Environmental Protection Agency's two-day seminar entitled "Asphalt Industry Environmental Solutions," presented in Dallas, Texas, March 21-22, 1979.

Conducted a two-day short course entitled "Performing and Observing Source Sampling," Phoenix, Arizona, August, 1990, for the State of Arizona, Department of Environmental Quality; Lincoln, Nebraska, March 1980, for the State of Nebraska, Air Quality Control Division.

Technical Experience

Directed and performed stack sampling on over 2000 sources of which over 500 were sampled simultaneously using more than one sampling train at several points in the flue gas stream; 1972-present.

Directed and performed over 200 short-term ambient air studies using mobile sampling vans and various ambient air sampling equipment; 1972-present.

Designed, directed and operated over 20 permanent ambient air networks of various size and duration for a variety of parameters; 1972-present.

Designed surface and underground drainage systems for residential subdivisions, public works projects, and shopping centers; 1969-1972.

Designed several residential subdivisions including lot layout, street design, drainage design, and utility design; 1969-1972.

AIR SAMPLING ASSOCIATES, INC.

MULLINS (p. 4)

Research Projects

Supervised and conducted a study made by the Hawaiian Sugar Planters' Association to characterize the emissions for several bagasse-fired boilers, April-May 1976.

Supervised and conducted a study made by the Rio Grande Valley Sugar Growers, Inc. to determine the area affected by the burning of sugarcane fields prior to harvesting, November 1974-April 1975.

Supervised and conducted a study by a lightweight aggregate manufacturer to develop a material balance around the process through sampling and analysis of several parameters, November 1973.

Conducted a study in New York City to attempt to develop a correlation in the ambient air between carbon dioxide and sulfur dioxide to provide a tool for predicting air pollution predicting air pollution episodes, January-May 1969.

Related Projects

Served as Chairman of the Engineering Foundation Conference on Stack Sampling and Source Evaluation in Destin, Florida, 2002, and Santa Barbara, California, 1985.

Served as Co-Chairman of the Engineering Foundation Conference on Stack Sampling and Source Evaluation in Destin, Florida, 2001.

Served as Session Chairman at the Engineering Foundation Conference on Stack Sampling and Source Evaluation in Hershey, Pennsylvania, 1984; San Diego, California, 1993; and in Palm Coast, Florida, 1994.

AIR SAMPLING ASSOCIATES, INC.

SCOT JACKSON; Associate

Education	B.S.B.A. May 1978, Mountain View Jr. College, in General Business.
Professional Training	Purchasing Supervisor for METCO Environmental, Inc. in charge of inventory and supplies. January 1995 – April 2005. Attended 40-hour Occupational and Environmental Training Program on Hazardous Materials (CFR 1910.120), Dallas, Texas, May 2000. Attended Fed-Ex Hazardous Goods Shipping Training, June 2004.
Certification	Certified Visible Emissions Evaluator
Technical Experience	Participated in the sampling of over 100 sources, including several of which were sampled simultaneously using more than one sampling train. Thoroughly trained in all EPA testing procedures, 1995-present. Experience with calibration techniques for all field testing equipment. Thoroughly trained in the operation and routine maintenance of the following: California Analytical Model 300-HFID Total Hydrocarbon Analyzer Servomex Model 1440 Carbon Dioxide Analyzer Servomex Model 1440 Oxygen Analyzer Thermo Electron Model 42C Oxides of Nitrogen Analyzer Thermo Electron Model 48C Oxides of Nitrogen Analyzer Western Research Model 721A Sulfur Dioxide Analyzer